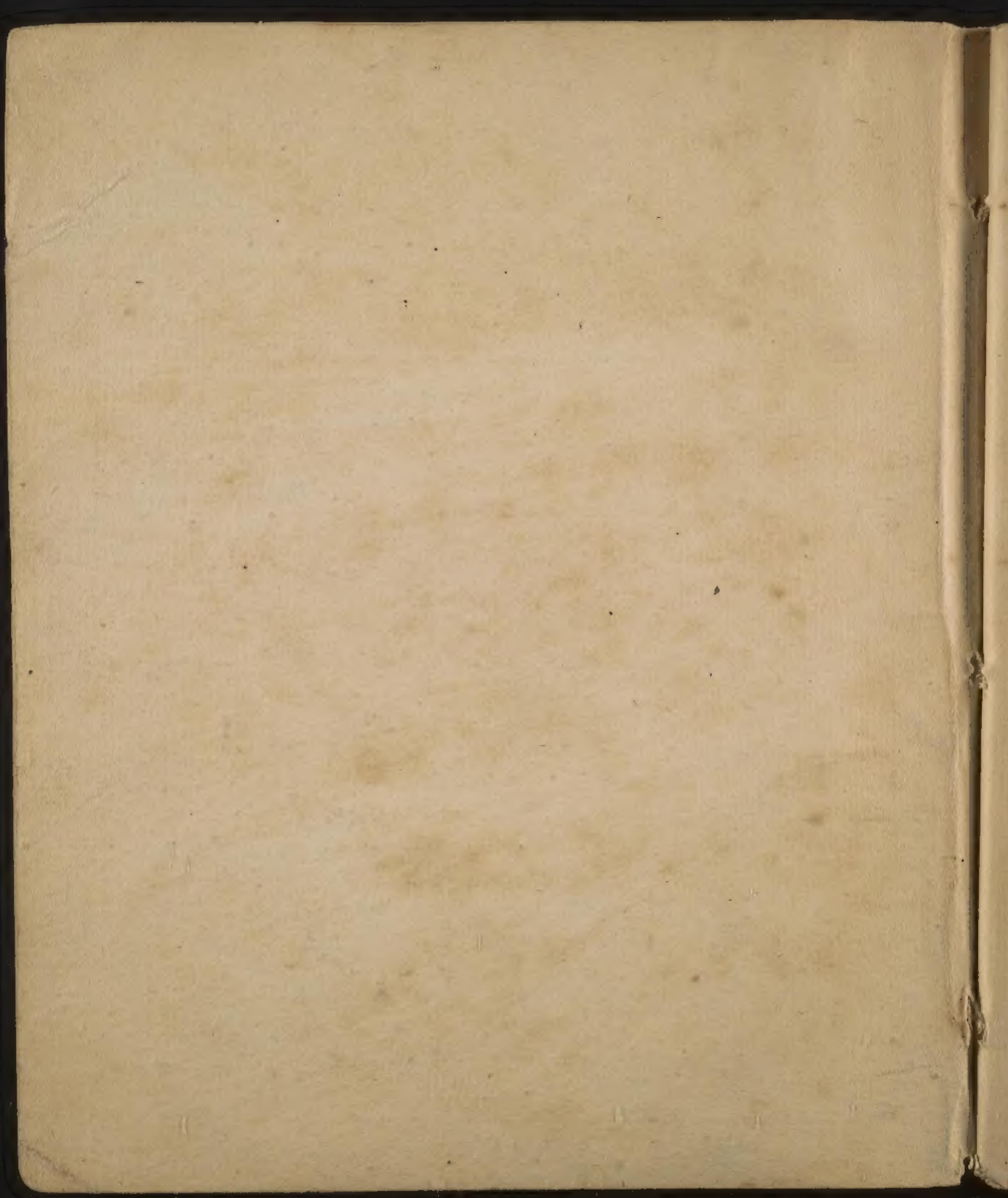


4i 2
7397
F 15

16



of Digestion 621.
By the cycle -
of the blood - 652.

✓ I shall first remark that the Stomach is a most important viscus, hence it is possessed by all animals, It is so full of nerves that it may be compared to a tremendous expansion of the brain. So essential are its functions to life, that it has said the soul is seated in it. It is certainly the index of the state of the system in many Diseases. It possesses a relation in health & sympathy in sickness to every part of the body. in health as well as sickness - The nerves and blood vessels may even the mind are affected by it. - hence it should never be lost sight of in inquiring & investigating, & prescribing for diseases of those parts. Many Diseases it is said enter the body thro' the medium of the

such parts of the mouth as to favor the action of the teeth upon it. It afterwards protrudes it into the fauces from whence it passes by the tonsils - Uvula palatina & Epiglottis apertis by the action of a great number of small muscles into the Oesophagus - and from thence into the Stomach where it undergoes the process of digestion. ^{Solids} ~~Food~~ more easily swallowed than fluids

of Digestion.

Brassicae In what manner is this performed? - The answer to this

question shall be the business of our ^{inquiry.} ~~the present lecture~~ - v

¶ The changes which the food undergoes in the Stomach principally

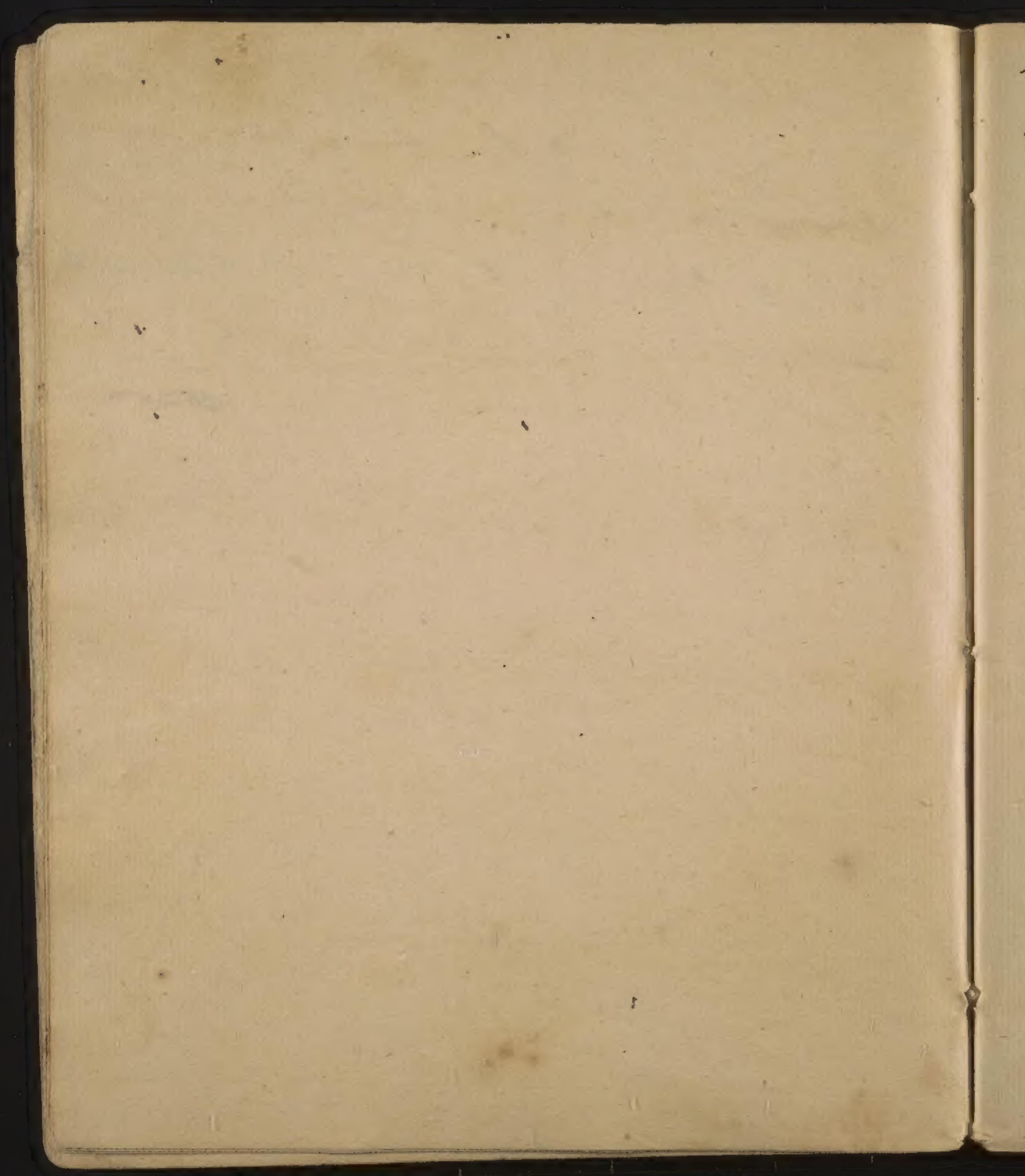
Stomach - still more I believe are
expelled from the body which act
primarily, & exclusively upon it. -
~~Best to swallow~~ -

It is formed ~~of~~ like the teeth upon the
compound principles of carnivorous
& granivorous animals.

Its function is an important one
in the animal Economy. ~~we behold~~
in it something like what the Alchemists
have sought for in their crucibles - in
their attempts to obtain gold from the
base metals - a power of changing the
most dissimilar & heterogeneous matters
into a ~~other~~ substance which imports
nourishment & life to the human
body. -

to its being converted into chyle, has been ascribed to the operation of two agents. These are 1 mechanical ~~and~~ and 2 chemical. The mechanical ~~includes~~ trituration only. The ^{putrefaction} - chemical includes ~~heat - pressure~~ - solution - and fermentation. of each of which I shall treat in order.

Much was ascribed to trituration by the mechanical physicians. Pitz-cavir has computed the force of the employed in digestion Stomach, to be equal to 12,951 pounds. Dr Burcham has enumerated all the forces which are ~~supposed~~ to act in digestion - There are the muscular action of the stomach - the action of the Diaphragm in inspiration - and



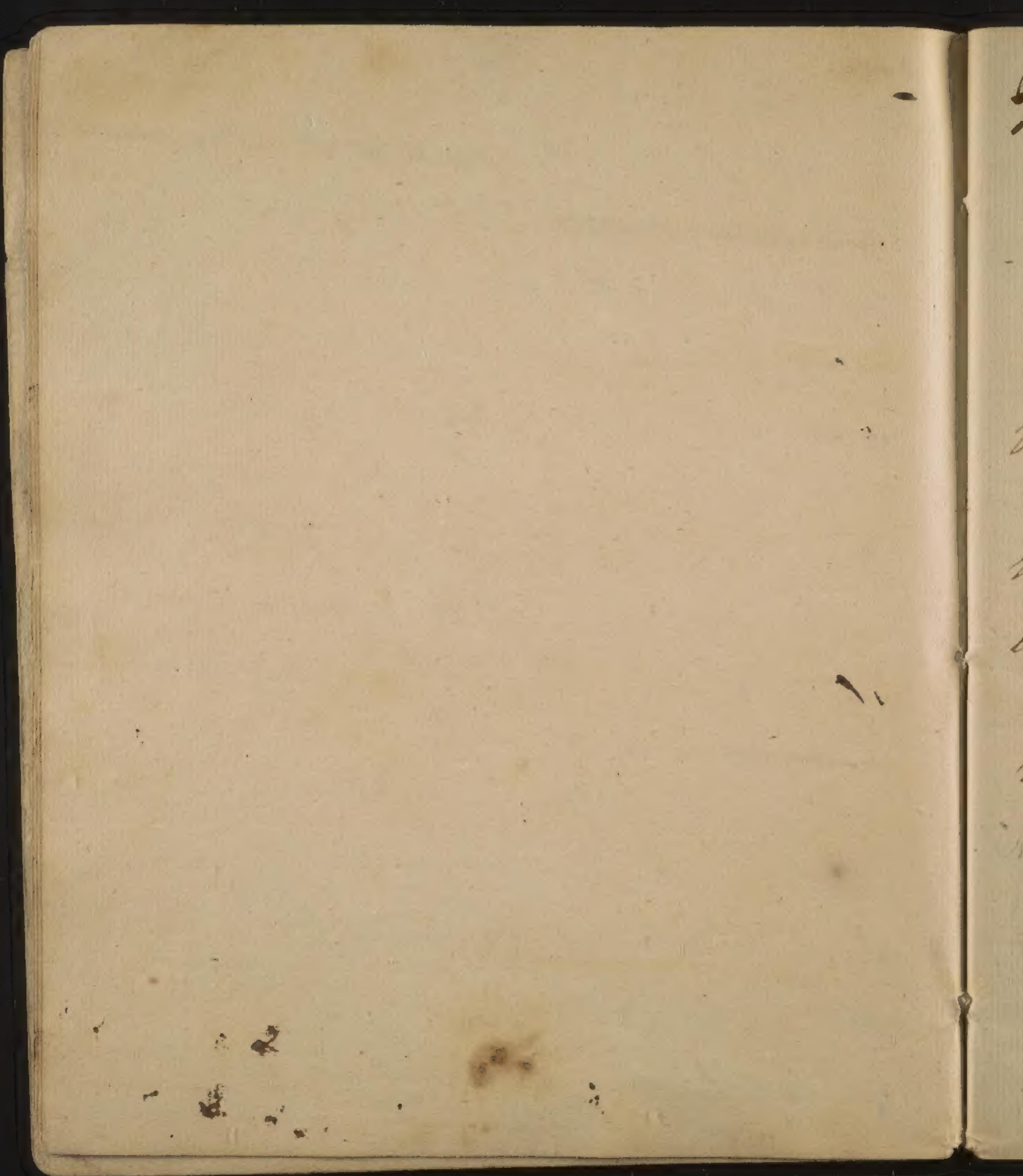
even

623

the constant pulsation of the Aorta
on the Stomach. ~~but nothing~~

~~soothing~~ Dr Pitcairn's calculation
of the force of the Stomach does not
deserve to be contradicted, and the forces
~~of~~ enumerated, ~~to~~ Dr Burhoeve,~~is~~
will appear to be very trifling from
the history of the following exp: made
by Spabarani. He swallowed 25
whole grapes - and discharged 18 of them
in an
~~without~~ unbroken state. He swallowed
many whole cherries afterwards, most
of which he discharged in the same
sound state in which he took them.

The triturating force of the Stomach
must be small indeed not to



have destroyed the texture of those tender
fruits. We proceed next to ingredients
the chemical agents which have been
supposed to be employed in digestion.

~~Food~~ I reject peristalsis altogether
from having any agency in digestion.
On the contrary the peristalsis of
the aliment unfits it so much for
being converted into chyle - that when
aliment which partakes of a solid
nature is reduced into the stomach, it
always exerts by the action of the
gastrojugal upon it. —

Expt. of Diana

Dr Spalaevski has determined this by an accurate exp² - he exposed a lep¹ with some flesh to a fire heat = to $\frac{1}{2}$ of human body - & the same quantity to a heat of the common air which was probably 20^o degrees below it. The first putrefied in 12 hours - the last - in 2 or 3 days -

✓ Mr Hunter found that the digestion of a frog which went on at $65^{\circ} 60^{\circ}$ was effectually checked ~~at~~ when it fell to 35° or 40° . ~~that~~ ^{It is from the influence} ^{in part} of heat that digestion goes forward more rapidly in warm blooded, than cold ^{go} animals. E.g. Dog - viper

Heat is essential to digestion. The polypus employs 2 or 3 days in winter in digesting that food which it digests in 12 hours in summer. ~~without~~ ^{no} solubition

~~coagulation~~ can take place ^{the} without it. The gastric juice which is the principal solvent of the aliment in the stomach ~~disco~~ ^{no more} has a ~~disco~~ ^{less} disolving power ~~in~~ in a heat of 44° or even 48° than common water. It is more active in a heat of 79° but its disolving power is greatest at 112° . ✓

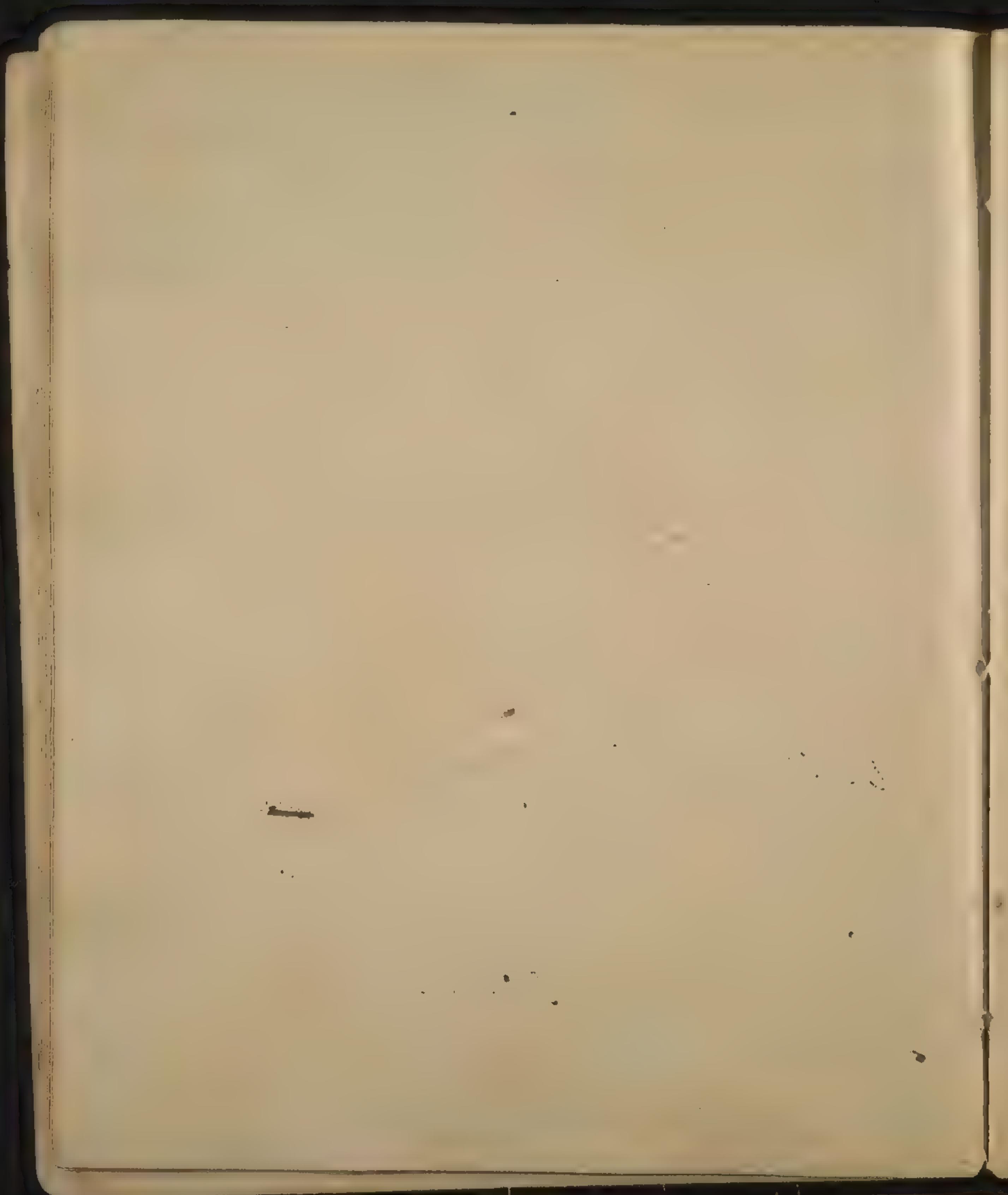
~~Heat~~ is likewise essential to fermentation, and no degree is more favourable to an active and perfect fermentation than the heat of the human body. ✓

v The dissolving power of the saliva has ¹² been established by ^{many} ~~most~~ experiments. ~~xxiv~~ ¹²
~~xx~~ of it are secreted in the course of
24 hours. It serves the purpose of
supposed of absorbing ~~oxygen~~ which
it conveys into the body. It has
neither taste, nor smell, and hence
~~it~~ it never impairs in its healthy
state either ~~the~~ of the power of taste or
smell.

Solution is likewise essential to digestion. The liquors which dissolve the food, are, the Saliva, & the Gastric juice.

~~To decide the dispute between ^{De gallo} Bignami & Linnæus, single, from one of whom ~~first~~, that it ~~proves~~ ^{the} other claims. The Gastric juice is the most active of these liquors. It was first observed by Bignami to have dissolved~~
 that the Gastric juice prepared a strong dissolving power over ~~over~~ ^{over} all ~~and~~ ^{and} ~~other~~ ^{other} ~~substances~~ ^{substances} by his experiments.

The same doctrine was established by Dr. Haller ^{many} years ~~ago~~ ^{before the time of Bignami}. This Gastric juice acts more or less in all animals, but more in some of



them than others. — Those animals
 which have grinders stand in the least
 need of it — for they divide the food in
 such a powerful manner that it after-
 wards requires but little vibration in
 the Stomach. Its dissolving power is
 very great in the human stomach — we
 may find cartilages — tendons & even
 bones are dissolved by it as well as
 common flesh. — It is probably more
 abundant and more active in Children
 & in old people than in ~~the~~ middle
 age, in order to supply the defect of
 mastication from the want of teeth.
 I have said all
 It acts most rapidly upon food that
 is well masticated, and upon flesh

IV The presence of nervous influence
is indispensably necessary to digestion.

By cutting, or tying the ^{the} pair of
nerves, digestion was destroyed in
a wolf & a dog, insomuch that
the contents of the stomach Dr
Haller says became putrid soon
afterwards.

which is perfectly done or well cooked. This was fully demonstrated by the exp^o of Dr. St. L'orix in his thesis on digestion. —

This gastric juice has been said by Frohner to digest the stomach after death. It is possible this is sometimes the case — but I am disposed to ascribe what he calls a corrosion of the stomach in some instances to a destruction of ~~by~~ by this liquid to a destruction of substance from inflammation or mortification. Such appearances are very common after death in all the bowels, where we are sure the gastric juice can exert no ~~digestive~~ corroding power. ✓

Spadanzani says he found digestion ^{to} go forward after death, but ⁱⁿ a very feeble degree after the heat

Y notice of this and.

In addition to these powers, in promoting
digestion, the influence of the ~~whole~~ ^{upper} soft
system is necessary for this ^{not only}
purpose - hence we find it impairs,
by depriving ^{but} of the mind, ~~and~~ by all those
accidents, and diseases, which divert
the nervous influence from it for ^{short} ~~the~~
It is exclusively an animal power,
much so as the formation of blood & bone,
& never less & perhaps never can be
initiated ~~out~~ of the body. - go to p. 644 ~~+~~

+ I beg this fact to be remembered. A abstinence &
low diet, founded on it. When we wish for the aid of
all the powers of life, in curing a disease, let us be
careful, let us be
give them nothing to do in digesting a quantity of food, or
food difficult of digestion. And
otherwise.

629

of the dead animal was dissected. -

The gastric juice yields by a chemical analysis a large proportion of the animal ammoniacal salt - in which is contained the phosphoric or animal acid. Take

The ~~prophet~~ prophesied a power of crowding with
this is evident to the ~~prophet~~ ~~prophet~~

of many young animals, particularly
Pitbulls, Calves, Turkeys & fowls. But

This power resides in either Criminal
or Civil law.

~~Beltrami's~~ is the ~~longest~~ staff - and it
also.

heart of a turkey. It ~~is~~ ^{and} is fishing

May 2000 it was the beginning of
the new century

~~the 21st day of April 1870~~ signed these facts

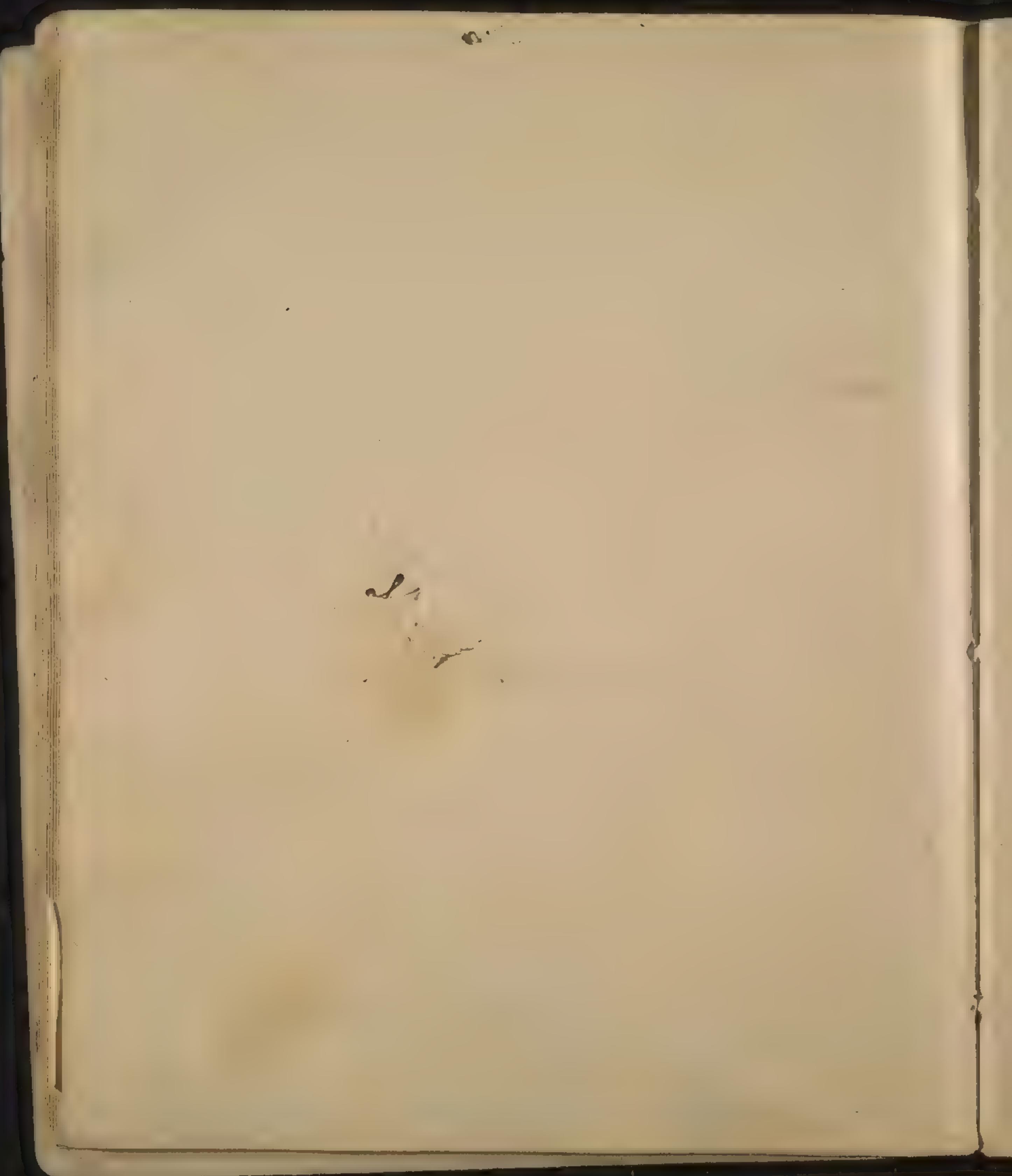
real PPG-9-643

~~early in September~~ early

~~Unfinished by me~~ Prop.

Want to see you again.

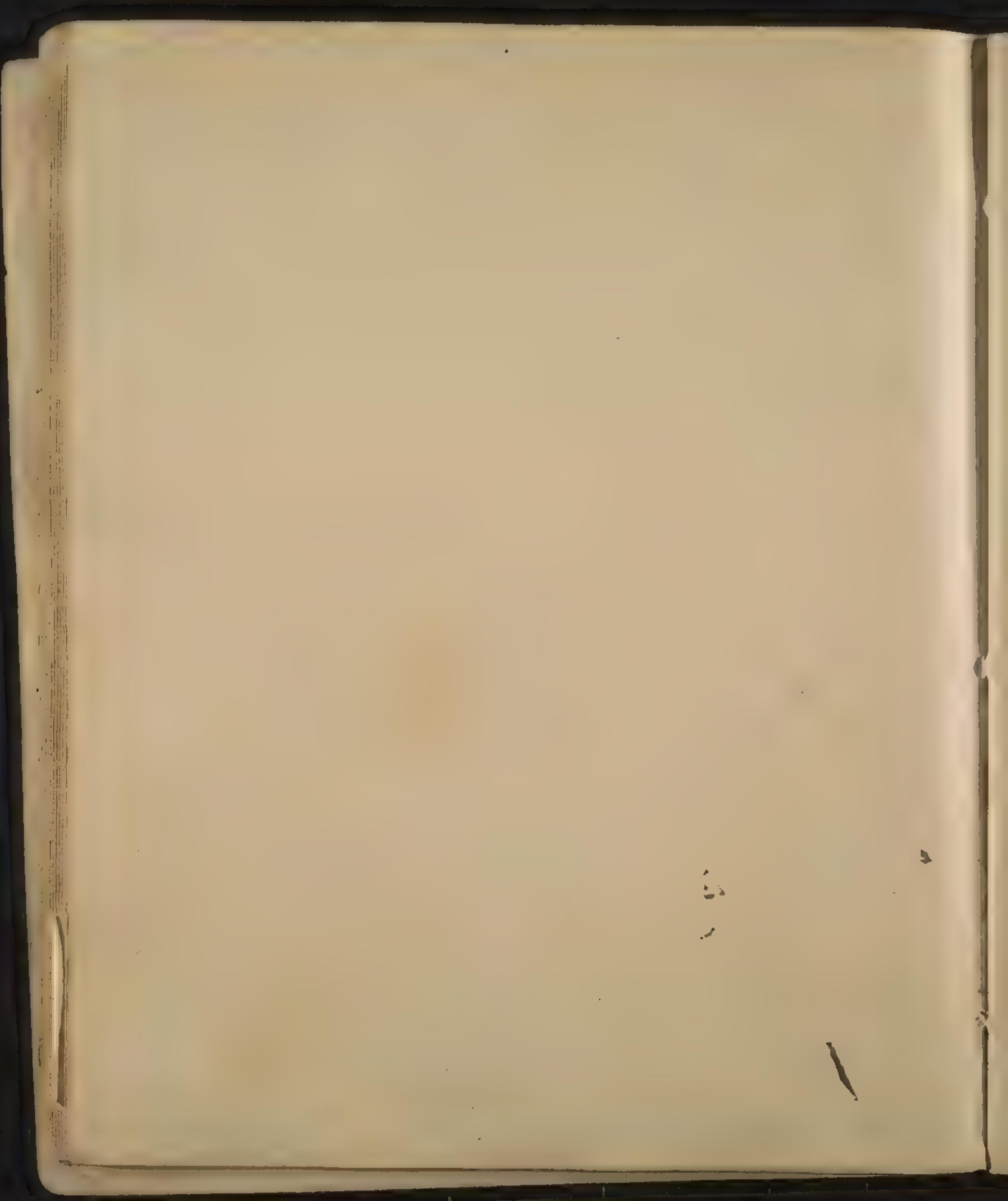
real pp 6-9-643
book 11-111872



juice, or that fermentation was
in a degree promoted by it. —

The Aliment being thus prepared by
Ingestion, undergoes a third change in
the Stomach by means of Fermentation.

I know this process in Digestion to be
rejected from the modern system of Phy-
siology — I know too that there is as
much a fashion in opinions as there
is in drfs. I shall however still defend
Fermentation as one of the causes
of digestion ~~first~~ because I have like
Gil Blas written a book upon it, but
because I cannot account for all
the phenomena of digestion without
it. Such of you Gent: who know



How many opinions which
I once believed and thought I have reje-
-cted in the course of the last ^{10 or 15} ~~20~~ years
will not accuse me of obstinacy upon
this subject. — my weakness in the
affairs of medicine is of a very ob-
-noxious nature. It consists in a dispo-
-sition to change ~~my~~ ^{my} account of a
disorder ~~changed~~ ^{to be willing} my opinions. If this
be a disorder in my mind, I do hope
no remedy will ever be discovered to
remove it — for so I conceive that for
ever to unlearn, ~~instead of learning~~
~~is~~ ^{is} the only way to come to a
knowledge of the truth. —

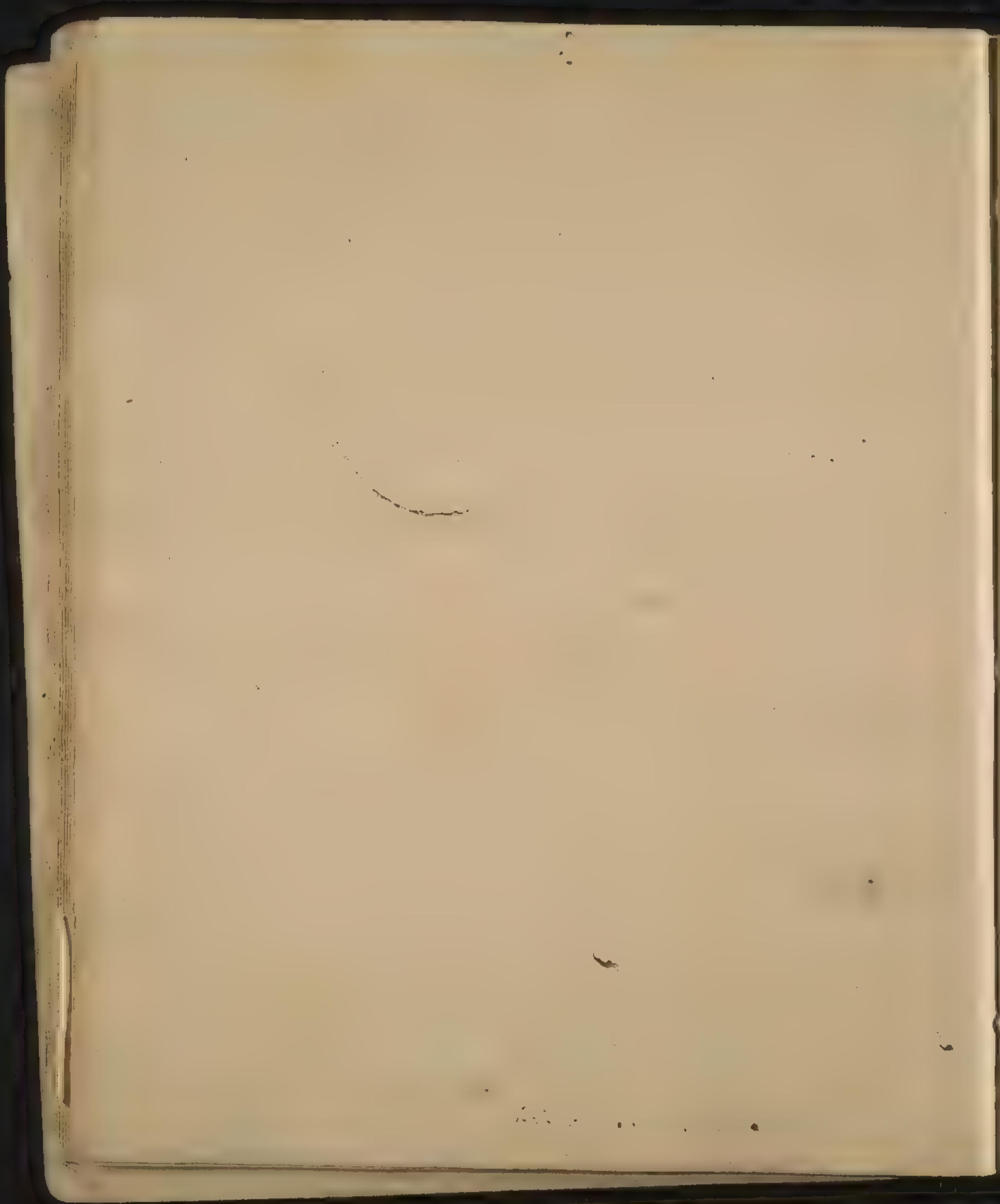
[By fermentation I mean that natural process by which ~~assimilates~~ heterogenous

—
—
—

531^o

matter is rendered homogeneous, so that a new product is obtained, wholly different from the original mass from which it was formed. —

Animal & vegetable & even fossil substances are all capable of fermentation. — It is specifically different in each of those classes of matter. ^{when} For vegetable matters, undergo the ~~process~~ of fermentation, they pass ~~thru~~ ^a this three stages — viz the vinous — the acetic & putrefactive state. It is uncertain whether animal matters pass thru the vinous — tho' some facts make it probable, but it is certain that they undergo the acetic ~~and~~ and putrefactive states. Dr Haller observes us



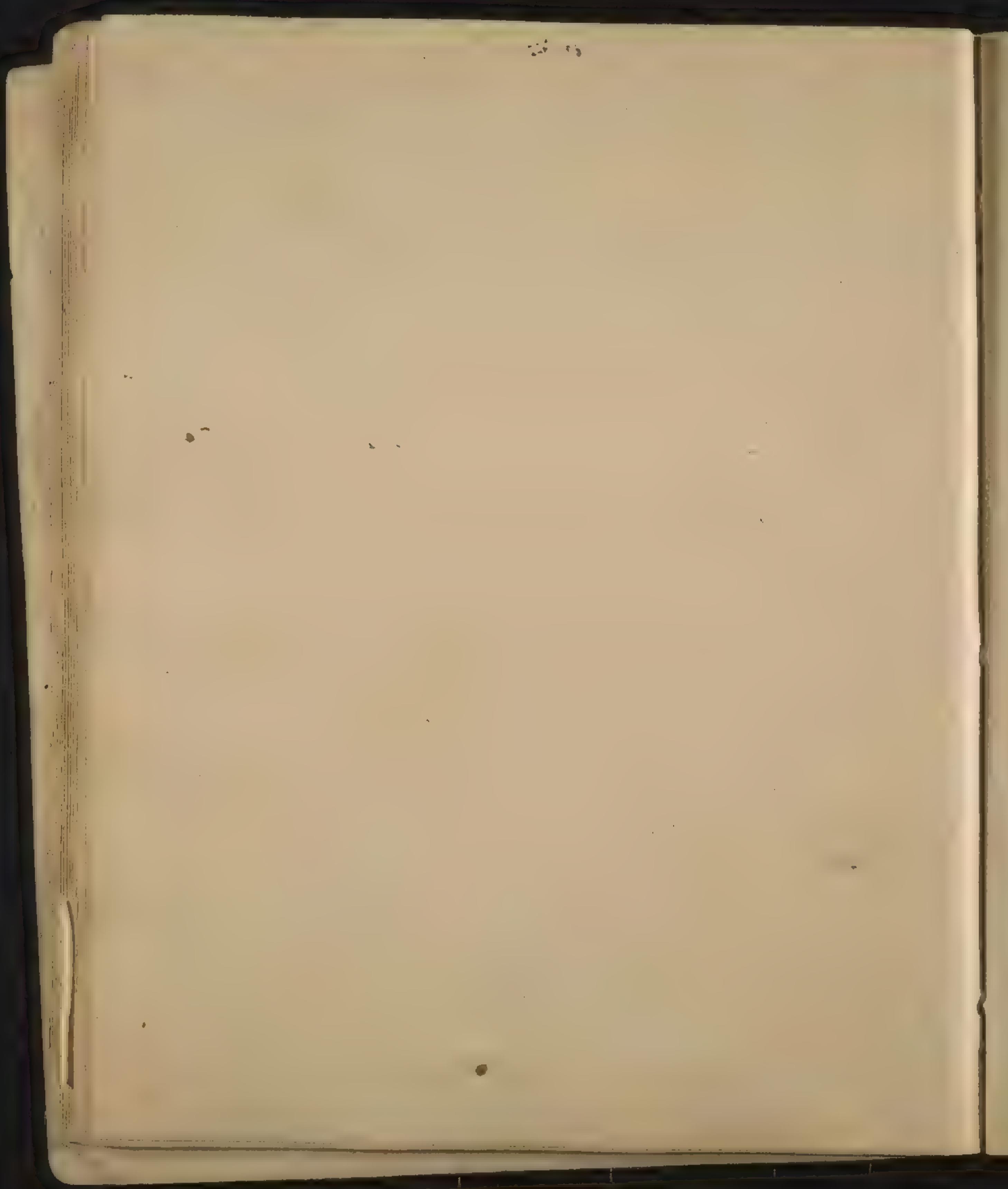
that he had distinctly perceived an acid smell
in meat, and Dr Thomas Smith informed
me that he distinctly perceived not only
an acid smell but an acid ^{taste} state in a piece
of beef which he had kept two days in
summer. —

These circumstances are necessary to
favour the fermentation I have described.

1 Heat from 72° to 112° are most favourable to it.

2 moisture: Sugar tho' it affords the
basis of fermentation in all vegetables,
yet may be kept in a sound state for
an 100 years provided it be kept free from
moisture. — 3 Air.

4 Rest: This is necessary to render all
the stages of fermentation regular.
Motion ^{whether moderate} either prevents it altogether



633

or turned it over suddenly to the anterior
or posterior ~~posterior~~ stages. —

The fermentation of all ~~matter~~
capable of it is quickened by certain ~~sub-~~
~~matter~~
called ferments.

Let us now inquire how far these
principles apply to the digestion of our
food.

1 Our aliment consists of such sub-
stances as undergo the various ~~autors~~
of the posterior stages of fermentation
out of the body. —

2 The heat of the Stomach is highly
favourable to the fermentation of
the aliment when received into the
Stomach. (3) Our aliment & Saliva are
both strongly impregnated with air.

3 The aliment passes from Saliva —

and digestion is favored by it.

Dr Haswood of Cambridge proved the advantages of rest after eating by the following experiment. He gave two pointers a hearty meal of flesh. One rested - the other ran two hours after eating. In the former all the food was digested - in the other - it was scarcely begun.

The state of the air influences digestion. The inhabitants of the ~~savannas~~ ^{ch} of Swizerland digest the ~~greatest~~ ^{ch} aliment ~~and~~ upon their mountain ^{which} ~~are~~ so ~~viscid~~ and gross that they cannot digest them upon their plains.

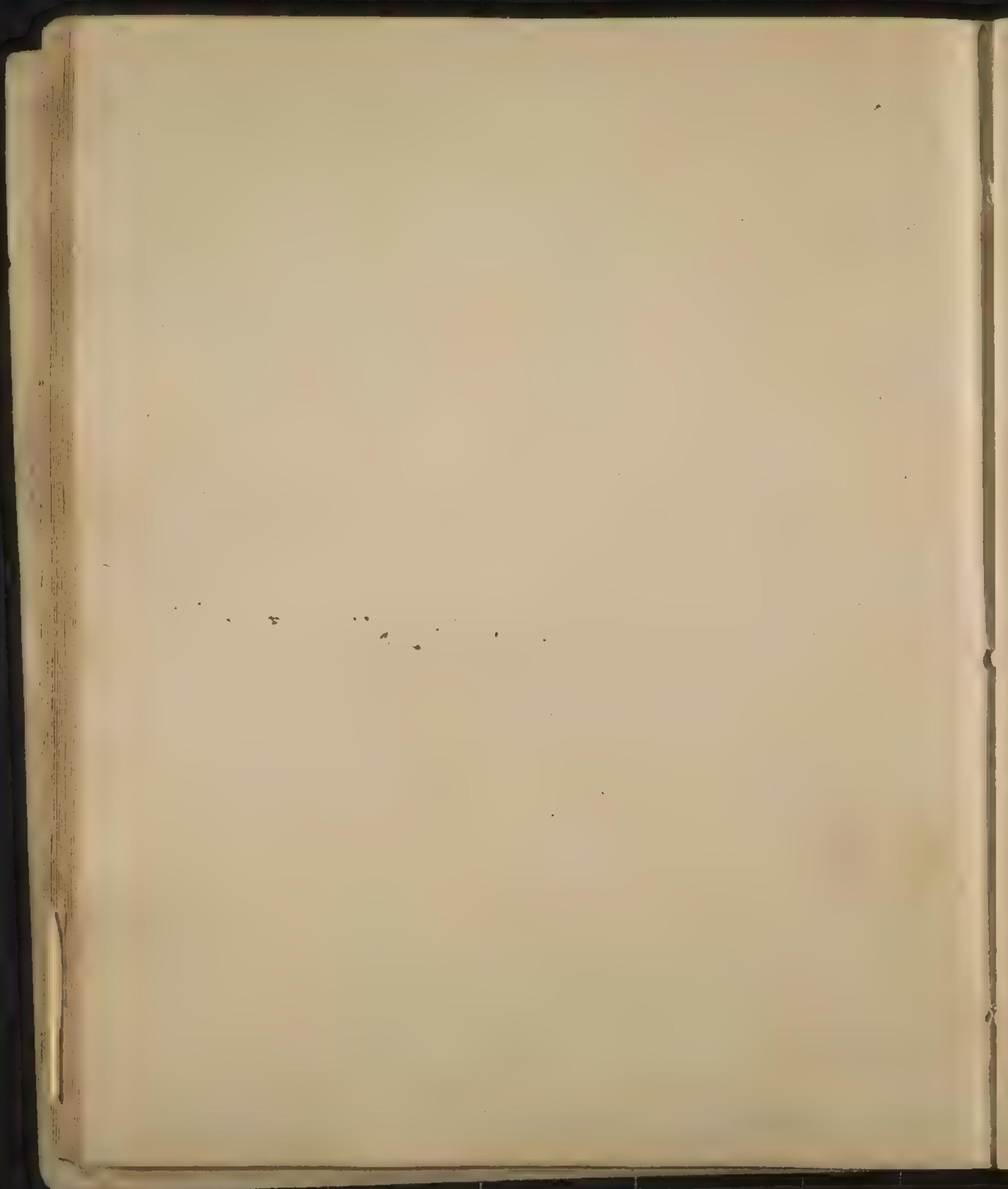
return ~~gastro~~ p 648 ✓

634

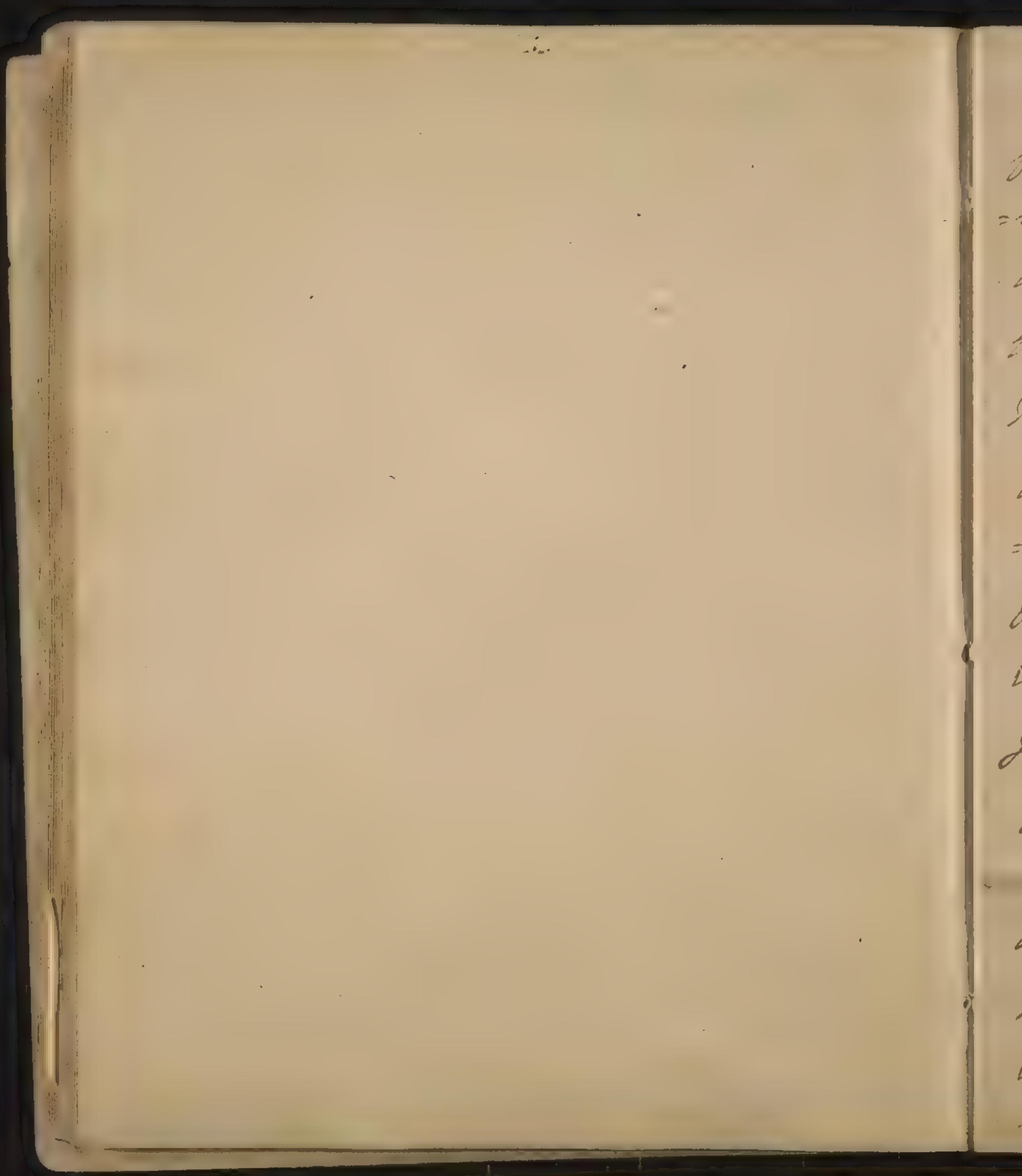
- gastric juice - and the liquids, with the
with over-breakfast, sufficient that
degree of moisture, which is amply suffi-
- cient to promote its fermentation.

3 Digestion is always best promoted by
moderate ^{when greater than the amount of water} rest-motion, impairs it if used irra-
After eating a heavy meal. ✓

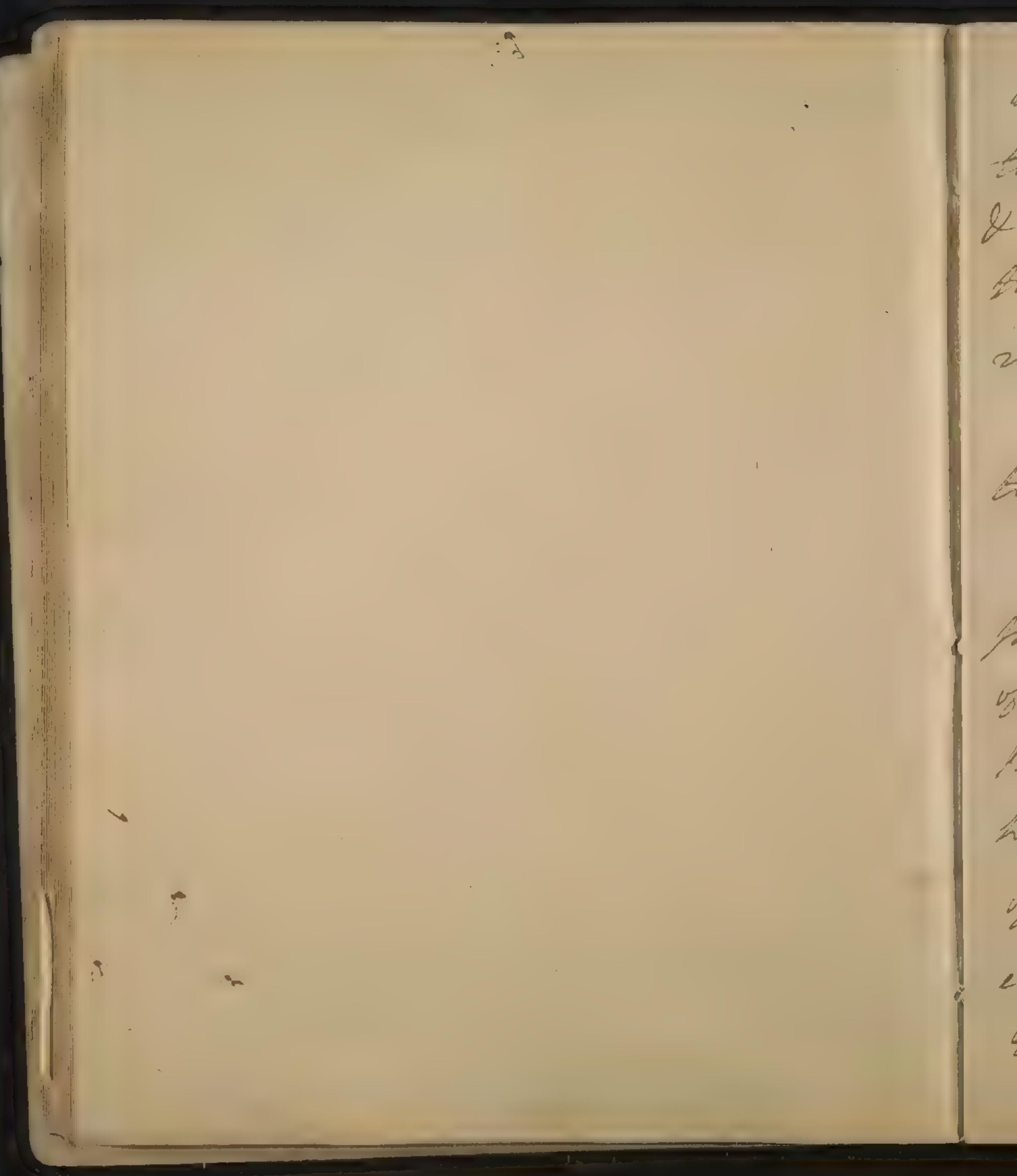
But it may be said that the rapidity
with which digestion is conducted in
the Stomach is too great for the slow
process of fermentation - tho' favoured by
all the circumstances which have been
mentioned. I should say ~~concern~~ in this
situation does not ~~desire~~ ^{desire} two things
which are calculated to accelerate
it beyond its ordinary term of duration
out of the body. These are ¹² its



speedy & perfect solution in the stomach
 by means of the gastric juice - now,
 heterogeneous liquors, ferment much
 sooner than heterogeneous matters of a
 more solid nature. — Part 2 by the
 action of the saliva upon the food ~~as~~
 makes a ferment and thus promotes
 its fermentation. That the saliva is
 a very essential digestive liquor
~~participates~~ ^{acts} in the process
 from the quantity excreted $3\frac{1}{2}$ in a day $2\frac{1}{2}$ hr.
 of digestion I infer from the waste of it.
 Being so generally attended with indigesti-
 on. This is evident in great numbers
 & chews of tobacco — Some years ago
 a certain kind of gum was used as a
 masking by the nobility of Spain to
 perfume their breath. It was produced
 this effect, but it spread Dipsomania,



& Hypochondriacs among them. But I go
 further, and add, that ^{the Saliva} it acts as a fer-
 ment upon the Aliment in promoting
 digestion. This I infer not only from
 the experiments of D'stabl, Boerhaave,
 Hoffman & Mc Bride, - but from the
 following experiment made by my-
 self. I took two pounds of mutton
 & bread - consisting of 3ij each & put them
 into separate Vials. To one of them
 I added ^{healthy} 3p of Saliva - to the other half
 an Ounce of water. I then ^{exposed} placed each
 of them to the same degree of heat in
 a box of sand in which I ~~had~~ placed a
 Thermometer so as to keep the heat
 as nearly as possible at the tempera-
 - ture of the human body. In five



hours the mixture with the saliva began to ferment, - in seven it became sour & in twelve it became putrid, - while the mixture with the simple water remained unchanged for 20 hours.

I repeated this experiment a ^{2nd time - and with exactly the same issue.}

Thus far Gent. have I mentioned ~~an~~ presumptive arguments only in favor of ^{ferment} ~~digestion~~ being essential to digestion.

But I shall not leave the controversy here. To decide it beyond all possibility of contradiction, I tried the following experiments - not upon hawks - cow -

horses - dogs - cows - horses For even upon Dr. Stoen's Hypothorax, but



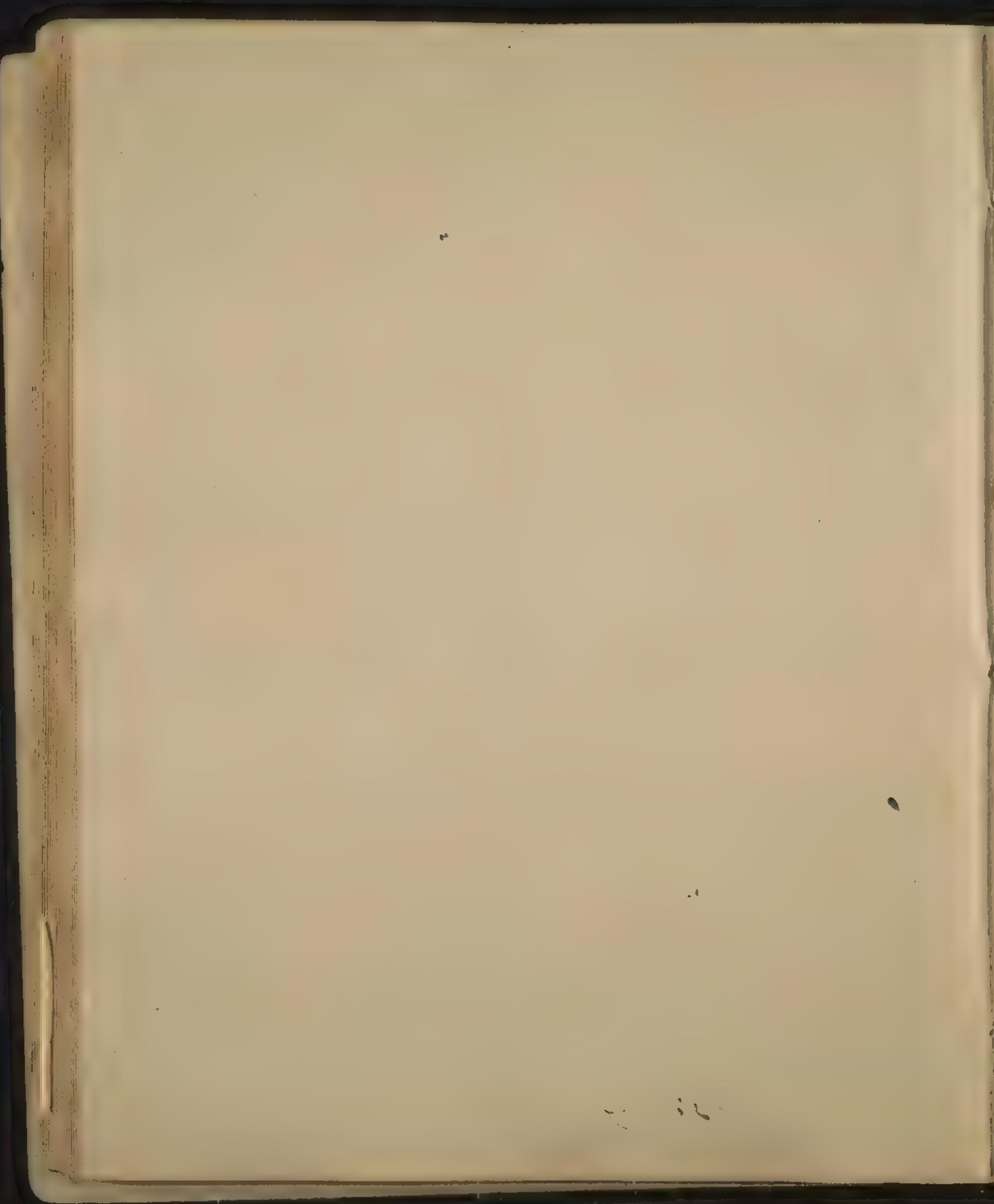
upon the abdomen of my own stomach,
at a time when I enjoyed the most
perfect health.

Exp^r 1

Having first taken a few grains of Salt of F in
order to destroy any remaining ^{or} ~~acid~~ in my
~~stomach~~ ~~since~~ ~~Beef~~ ~~bread~~ ~~espouse~~
stomach after my last meal, I
~~had~~ ~~small~~ ~~salt~~ ~~bread~~ ~~etc~~
dined upon Beef - bread - pence & small
beer. Three hours afterwards I took
two grains of Tart. Bmet. & threw
up the contents of my stomach. They
were acid to the taste, & imparted a
red color to an infusion of a blue
flower.

Exp^r 2

Having taken Salt of F as before, I
dined on meat - bread & pence, & drank
water only with them. Three hours



Afterwards I vomited. The contents
of my Stomach were sour, & produced
the same red color upon being mixed
with a blue vegetal ⁴⁰ infusion.

Exp^r 3.

Having dined on poultry - cabbage - and
unleavened bread, I took a Vomit ^{at} ~~three~~
the usual hours afterwards. The vomit
was exactly the same as in the two
preceding experiments

Exp^r 4.

Lest it should be inferred that my Stomach
was disordered - or possessed
an acid Diassimilasy - I consulted upon
one of the most healthy ~~Health~~ ^{Health}
young Englishman in the University
of Edin^r ^{D. Penny} in the year 1767 to and me



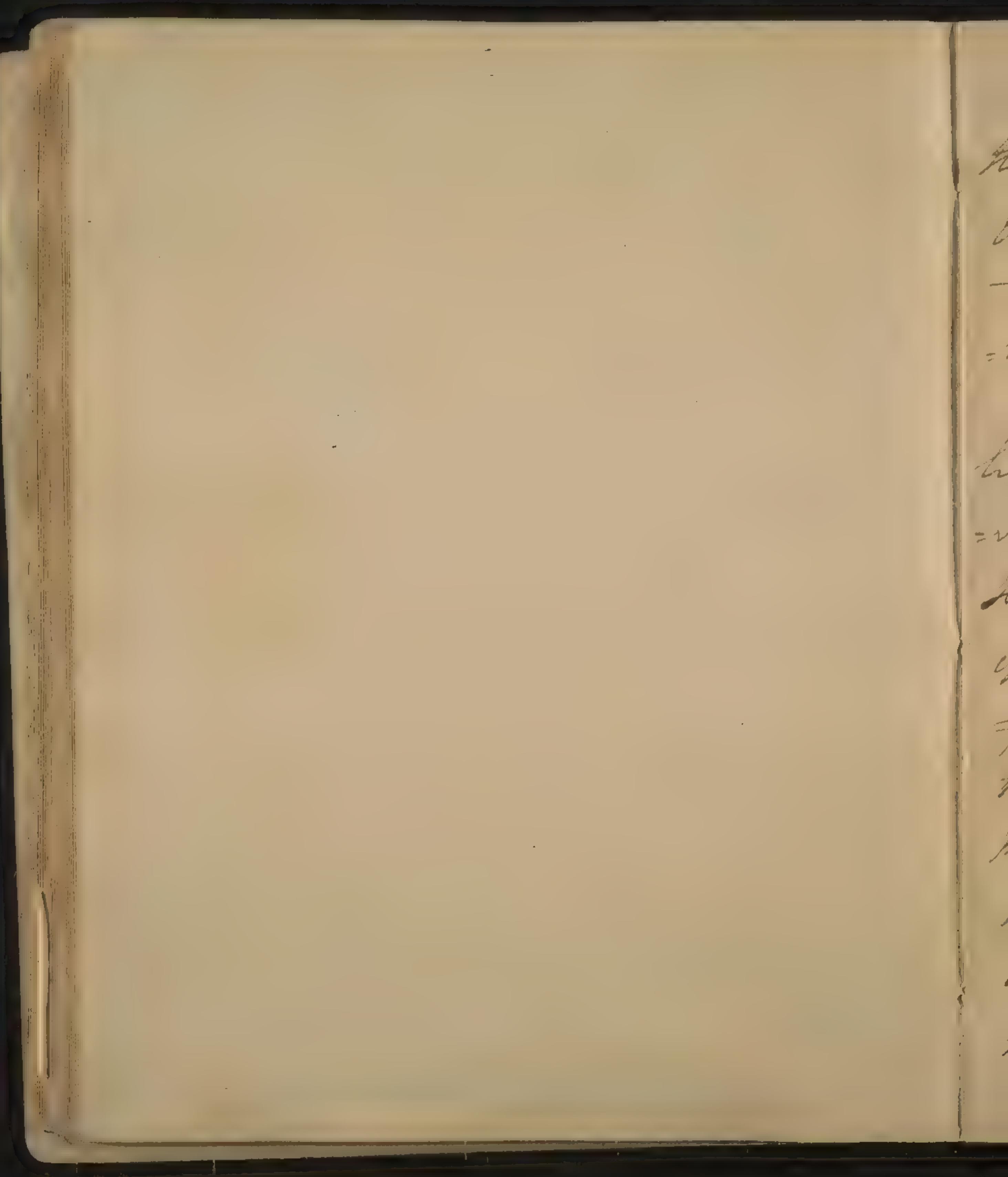
640

the aid of his stomach in pressing my
inquiries into this subject. He dined
with me on duck - beans - & drank
small table beer with them. Three hours
afterwards he vomited. The ^{liver} he
discharged was sour - & imparted a red
color to the black vegetable infusion.

These experiments were made frequently
repeated, & sometimes varied - but al-
ways with the same issue. —

I know that great pains have been
taken to discredit them by a report that
I was not in health when ^{I made} ~~take~~ them.
but this is begging the question. Mr.

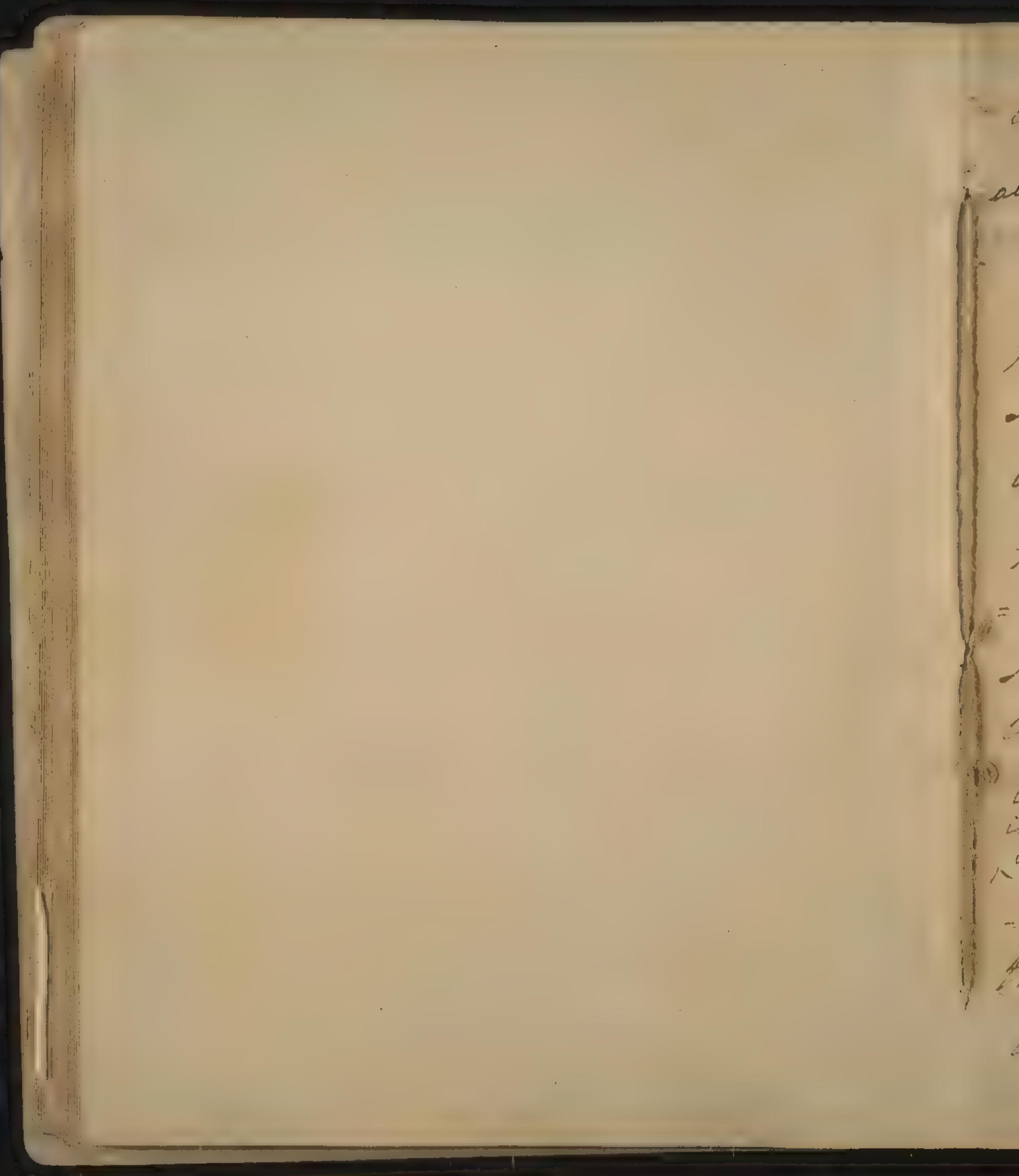
Jose a German Physician who
has lately written on digestion admits
my experiments, but ascribes the
being in health



641

acid liquor which I discharged to
the ~~single~~ ^{single} stomach
the acid of starch Remlett's being separated
from the Antimony in my stomach.

I concur with *S. Walazzo* in all his & my impressions of the wonderful digesting power of the Gastric Juice - but ^{alone} Nutrition will not exchange the Nature of Aliment, or produce any new compound - much less will can it produce the same liquor from all the different kinds of Aliment which are taken in the Stomach. Is there a monster ⁱⁿ Chemistry, - that produces exactly the same compound when mixed with every different metals - carbons - salts - &



I ask the question again - is there
 any analogy to the Gastric Juice in
 all ^{the} Nature - if we allow it to possess ^{any} ~~but~~
 only a dissolving - but an assimilating
 power - over the most heterogeneous
 substances with which it is obliged to
^{answer} ~~have~~ ^{any} ~~not~~ -
 unite in the Stomach? [I beg pardon
 first for this challenge - I now recollect
 - but one - and but one analogy to it -
 It is found, not in the body of Nature,
 but in Ancient fable - it is the Staff
 of ^{hail} Midas which turned every thing
 it touched ^{into} Gold - and it differed only in per-
 forming this change more suddenly,
 than the Gastric Juice converts our
 Aliment into Chyle.] -

I think it probable that the

✓ I conceive this Aiid to be formed
unusually, and to serve very im-
portant purposes in the medical
Economy. —

+ ~~In explaining~~ ^{for explaining} particular functions
it is necessary to keep any eye upon all
~~processes wh: go forward~~ ^{which go forward} in every part of the body,
~~the functions of the body~~ — Otherwise we
shall make as great mistakes as Physi-
-ologists, as those Physicians make who
prescribe for Symptoms only in a ^{few} disease
without regarding the state of the whole system.

digestion in a healthy state always
 ceases as soon as an acid is evolved
 from the aliment. ^{The} ~~This~~ acid soon
 we find in the animal salt; and
 afterwards becomes a basis of phos-
 phorus - ~~the basic carbonate~~ ^{appears to be formed} from it.
and It is the ^{Absence of this acid} ~~presence~~ probably
 which produces the ferruginous & its podo-
 minance which forms the nucleus
 of the stone. It exists in a material
 only - and not in a formal state
 after it leaves the stomach, for it is
^{covered} ~~covered~~, after it is changed into chyle
 to as to not to be perceptible ^{disengaged} by
 the common tests of acids. It

Others have I delivered my opinion
 upon the subject of digestion - morphall
 I yield it to Palanzani - Stevens -

For ~~now~~ detailing the facts & exp^t in
favor of fermentation taking place in
the Stomach; I have not availed myself
of the last ~~aid~~ from the Air & humor
which are often discharged from the
Stomach in digestion - for I consider them
whom ^{as} ~~explaining~~ ^{as} ~~after, when they depend~~ ^{as}
upon a relaxation of the Stomach, and
an ~~exp~~ in the fermentative process.

or dose 40 untill they have taken
 as many pulses as I have done, to
 establish the ~~facts~~ postures they have
 given to the world.

✓ There is but one ~~trap~~ waiting
 to ~~establish~~ ~~the~~ ~~my~~ ~~story~~ - & it is to ex-
 amine ~~by distillation~~ whether the con-
 tents of the Stomach will yield by distil-
 lation a Vinous Spirit. - If they should,
 it would prove fermentation in the
 Stomach as ^{one of} the causes of digestion be-
 yond all possibility of being doubted]

¶ I shall now add a few Observations
 upon the phenomena of which go for-
 ward in digestion. -

There is after every full meal
 a slight fever. It is sometimes ushered

Dr. Brown's death which
undeservement^{is} highly
probable. He died in 1802
with yellow fever before
he had completed his
Drafts.

A Dog was killed his body opened and a thread tied round the Duodenum just below the pylorus, the duodenum and oesophagus were then cut off & the stomach immediately taken out & nearly all the gastric juice poured out, it was then filled with dough made of wheat flour & water & covered over in warm sand, in which Thermometer stood at 96° with the divided end of the oesophagus just above the surface of the sand, in this situation any change which might take place in the dough would be easily observed, a piece of dough was moistened with water & covered in the sand by the side of the stomach, by way of comparison - in two hours & three quarters a very active fermentation was observed in the stomach - the dough worked up & run out of the oesophagus - no change in the dough in the sand

Experiment 2

A Cat was next killed & the stomach taken out as quick as possible to prevent it from cooking - the thread & other precautions to save the gastric juice was neglected & the stomach immediately covered in the sand & a lump of dough about the size of a walnut put in the stomach & the same quantity put in a vial containing a small quantity of water, in one hour & twenty minutes there was a considerable motion in the stomach & the dough worked up three fourths of an inch above the end of the oesophagus - no change in the dough in the phial -

Experiment 3

Another Cat was killed & the stomach taken out this stomach contained a large quantity table spoon full of the gastric juice about two thirds of which was poured out into a phial equal parts of dough was put into the stomach & phial the phial was used by way of comparison - in one hour & twenty minutes the dough in the stomach shew signs of fermentation the working increased & in 1/2 hours the fermentation was so considerable as to force $2/3$ of the dough out of the stomach - it was compared by a bystander to the working of a barrel of Cyder - the motion continued until 6 hours at which time the sand was suffered to cool - not the least signs of change or motion appeared in the dough in the phial

645

in with a slight degree of chills, and in weakly people it is often terminated with a gentle sweat. This fever is occasioned by the stimulus of ~~the~~ meal being overproportioned to the excitability of the system, produced by hunger. — It is not necessarily connected with eating — nor is it produced after a slender meal. The knowledge of however of the existence of this fever, may be applied to several useful purposes. — It should lead us to recommend a plentiful meal to all persons who are about to be exposed to the cold in ~~an open field~~ which they cannot use, ^{much} otherwise ~~for a small~~

✓ for the time is now yet was when
philosophy up and either war or
government

pamphlet which I published during
 my attendance on the military hospitals
 for entitled "Directions for preserving
 the Health of Soldiers" I recommended
 in strong ~~terms~~ terms that a soldier
 should never do the duty of a sentinel
 in cold weather, but after a ~~full~~ ^{hearty}
 meal. ~~but~~ I am sorry to say that this advice
~~is~~ ~~not~~ ~~generally~~ ~~followed~~
 2 There is frequently a disposition to
sleep after a full meal. This is owing
 to the ~~excessive~~ ^{fulness} of the food producing
~~distension~~ ^{coma} in the brain ~~and~~ ^{and} tending to the ~~lethargy~~
~~and~~ ^{rest} ~~with the~~
~~head~~ ^{is} most commonly removed
 by the additional stimulus of ~~coffee~~
 tobacco in the form of snuff or
 cigars or by a few glasses of wine.

82

This sleepiness is not necessarily connected with eating. It never succeeds a moderate meal. Lewis however tells us that after he adopted ~~the~~ ^{the} more & temperate mode of living ^{it} restored his health, & prolonged his life to the most extreme old age, he found no disposition to sleep after eating.

3 The mental faculties are generally affected by a full meal. But this likewise does not follow a temperate repast. Lewis however used to ^{exchange} ~~exchange~~ ^{an} ~~an~~ ^{an} ~~an~~ for a book, or his pen & ink, & never found any inconvenience from it after he began to live a life conformable

6. The food generally lies from 1 to 7 hours
in the stomach according as it is more or less
~~so~~ easy of digestion. Its ^{time is from 13 to} medium ~~is~~ five
hours ^{and} ~~and~~ as it is animal or vegetable.
and shall hereafter mention
instances of ~~undigested~~ substances lying
days - weeks - months & even years in the
stomach without being digested. p 2649 =>

to reason'd nature. —

4 There is generally a disposition to ~~rest~~ⁱⁿ after a plentiful meal, ~~but~~ⁱⁿ ^{digestion}

D^r Hammond of Cambridge proved the advantages of rest by the following experiment. He gave two pointers a hearty meal of flesh. One rested; — the other ran two hours after eating. He then killed them both. In the former all the food was digested; in the latter it was scarcely begun

5 The state of the air influences digestion. The inhabitants of Switzerland digest aliments upon their mountains which they cannot digest in their valleys, nor upon their plains. ^V — not even, ~~not~~ for a thoracic

~~Disease, without enjoining my patient
to make six or seven small meals,
instead of two or three large ones in
a day. There are many instances
of apoplexy & palsies following full
meals in persons of delicate health,
and ~~caused~~ of sudden death from the
same cause~~ I have said

=17 The passions have a great influence
upon the digestion of the food. It is invi-
-gorated by cheerfulness - hence we feel
least inconvenience from full meals
which are followed by cheerful con-
versation. ~~The passions~~ ~~excite~~
It is retarded by grief - fear - and
shame - the passions seem to act
only upon the muscular fibres of

✓ Is there not a proportionate afflux
of the Electroic fluid of the nerves
to the stomach which accelerates
the fermentative process, & thus im-
pairs the digestion? It seems probable
from an exp^r related by Dr Johnson.
If the 8th pair of nerves which goes to
the stomach be divided, digestion is
immediately interrupted, & the food
goes on the nature of feces in the
stomach —

✓ you some of you will perceive a
fault: I have changed ~~changed~~ ejected ferment^r
from being one of the causes of the

of the Stomach. In the former case the Stomach is assisted in propelling the Aliment after it is digested into the Pylorus; - in the ^{latter} case, the debility of the Stomach induced by the relaxing spasms prevents its acting with its usual force in throwing the food out of the Stomach.

The Aliment ~~when~~ ^{when} it is digested is called Chyme. After it passes into the ^{intestines} it is mixed with the bile. The cystic bile is said to ~~not~~ precipitates its fecal parts from it, and imparts to them its peculiar color. It is now called Chyle.

I have thus mentioned the means by which Chyle is formed by the Stomach, but it requires the aid of another viscus to render it fit for

composing perfect animal nourish-
ment. This view, I believe to be the
liver. The common opinion of the
office of this large & noble viscus is
that it is intended ~~for~~¹ to furnish
a fluid which by mixing with the
~~the~~ chyme that descends from the
stomach forms the chyle. The chyme
was supposed to be of an acid na-
ture, and this acidity was said to
be destroyed by the bitterness of the bile.
This opinion was founded upon some
experiments made by Dr Ramsay of
Edin^r and was taught by Dr Cullen.
2 The liver was supposed by some
physiologists to be a large excretory
viscus intended to separate & throw^V



of the Lymphatics or Absorbing system.

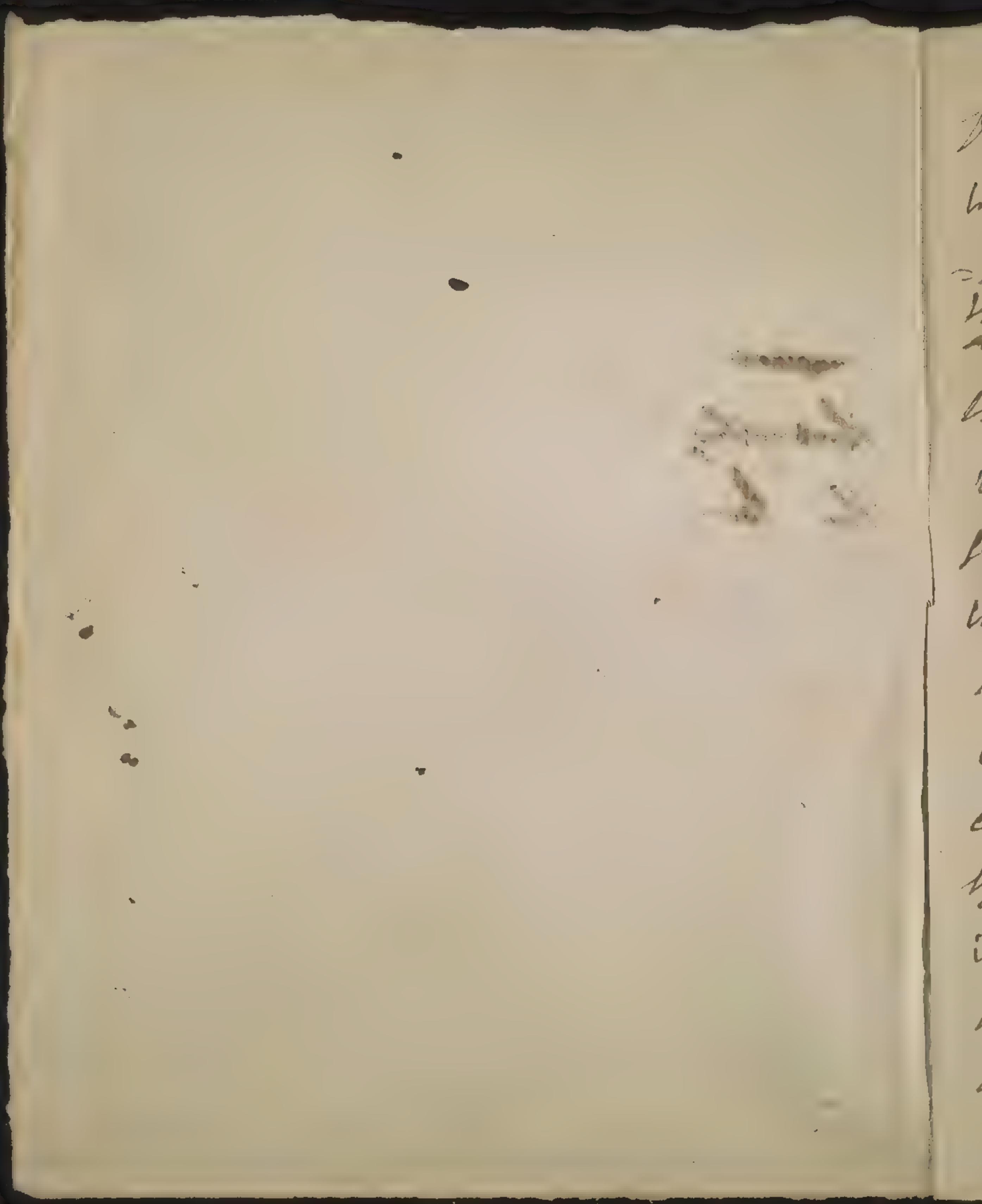
Upon this subject you are not to expect a minute detail of all the opinions & controversies which ~~have~~ are to be found in books. ~~of~~ Such a detail would be as useless, as it would be tedious. I shall relate only such facts & principles as appear to be true, and deduct such principles only as ~~do~~ admit of being applied to pathology & the practice of Physic. -

By the Absorbing system is meant the Lacteal as well as Lymphatic vessels. They are alike in so many particulars, ^{that} they have been designated by one name. They both open into cavities of the body - they have the same structure - they ^{in the} have these ~~same~~ glands in some cases.

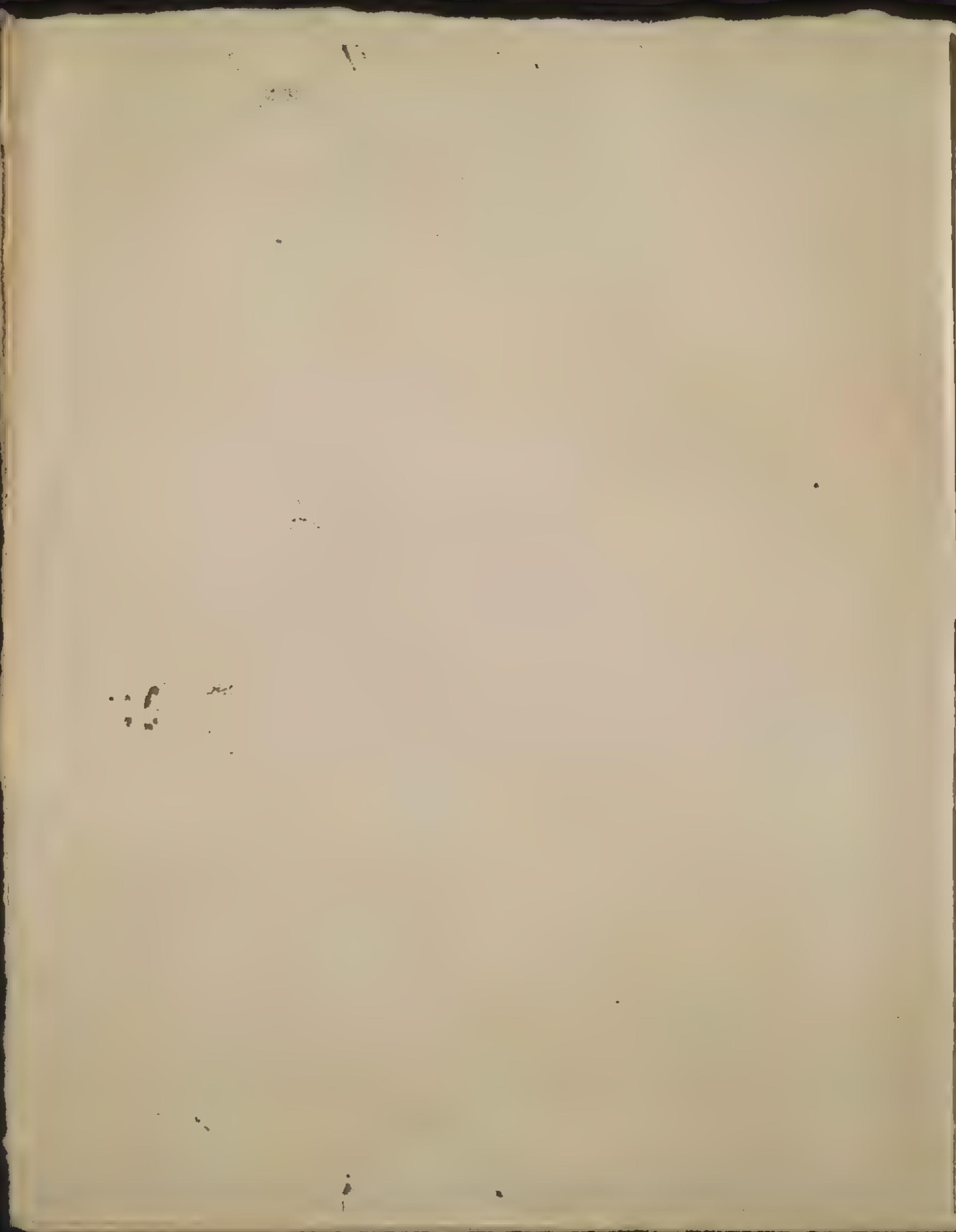
'of the Cycle'

p: 654 before
Lympkrotis.

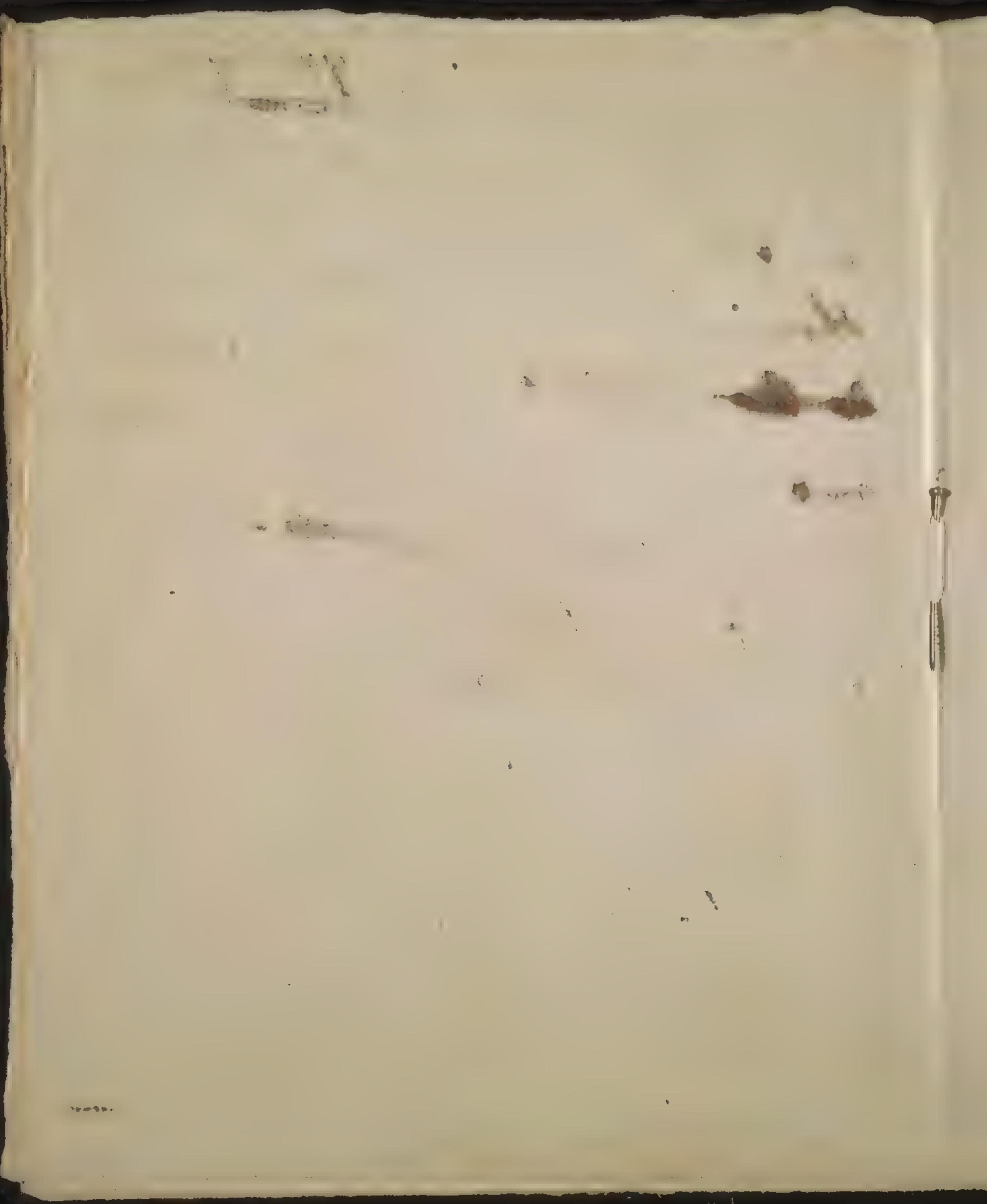
We return to pursue the Chyle which when
formed by the stomach and liver ~~has~~
been described is conveyed ⁱⁿ
~~by~~ certain vessels distributed plentifully
through ~~the~~ the small, and passing by this
the large gutts called Lacteals from the
milky color of the Chyle ~~they~~ which
pass through them. These lacteals
have been supposed to perform the office
of Absorbents by some Physiologists, while
others suppose they perform the office of se-
cretory vessels, and that ^{they induce} ~~they absorb~~ by their
action a change upon the Chyle analogous
to that which a gland imparts to the



Fluids which enter into them. The Chyle
whether admitted into the Lacteals by ab-
sorption or secretion is conveyed by them
~~thru the~~ ^{the} ~~secret~~ ^{secretory} into a large Canal called
the Thoracic Duct which runs along the
vertebrae, and is joined from it into the left
Subclavian Vein in which it is mixed
with the blood, and conveyed to the heart.
By what process it acquires all the properties
of blood ~~is~~ remains yet to be
explained. Dr. Hunter has thrown some
light upon this mysterious subject in his
ingenious inaugural Dissertation. He has
discovered by many experiments that the
Chyle is可通able in the Thoracic Duct,
and after it enters the Arteries, but that



quality in
it parts off its coagulating ~~power~~ to the
veins. From this you see it acquires
one of the properties of the blood in the
thoracic duct, and in the Ateries; but it
~~is~~ ^{is} deficient in others. It should
no [—] marks of what is called
— ^{what} Vitality, or ~~power~~ I have
called animating of the Coagulable
Lymph of the blood, when subjected to gal-
vanic influence. The Doctor supposes
further, that the blood like the bones
and muscles possesses a power of conser-
ving the matters which are brought
into contact with it into its own ~~the~~
~~—~~ true, and hence he says the cause of



Stargriffication.

The faeces when precipitated from the
colon pass slowly into the large gut.
There are occasions, in order to
prevent the ~~explosion of~~ ^{explosion of} gas
and insomuch as our frequently
discharging them in old age they
stagnate for many days without
much injury to the system: on the
contrary, they probably perform the
offices of those flannels which have
passed out, or have borne full in
old people, and thus help to keep up
the actions and machinery of life.
The stagnation of the faeces in ~~the~~

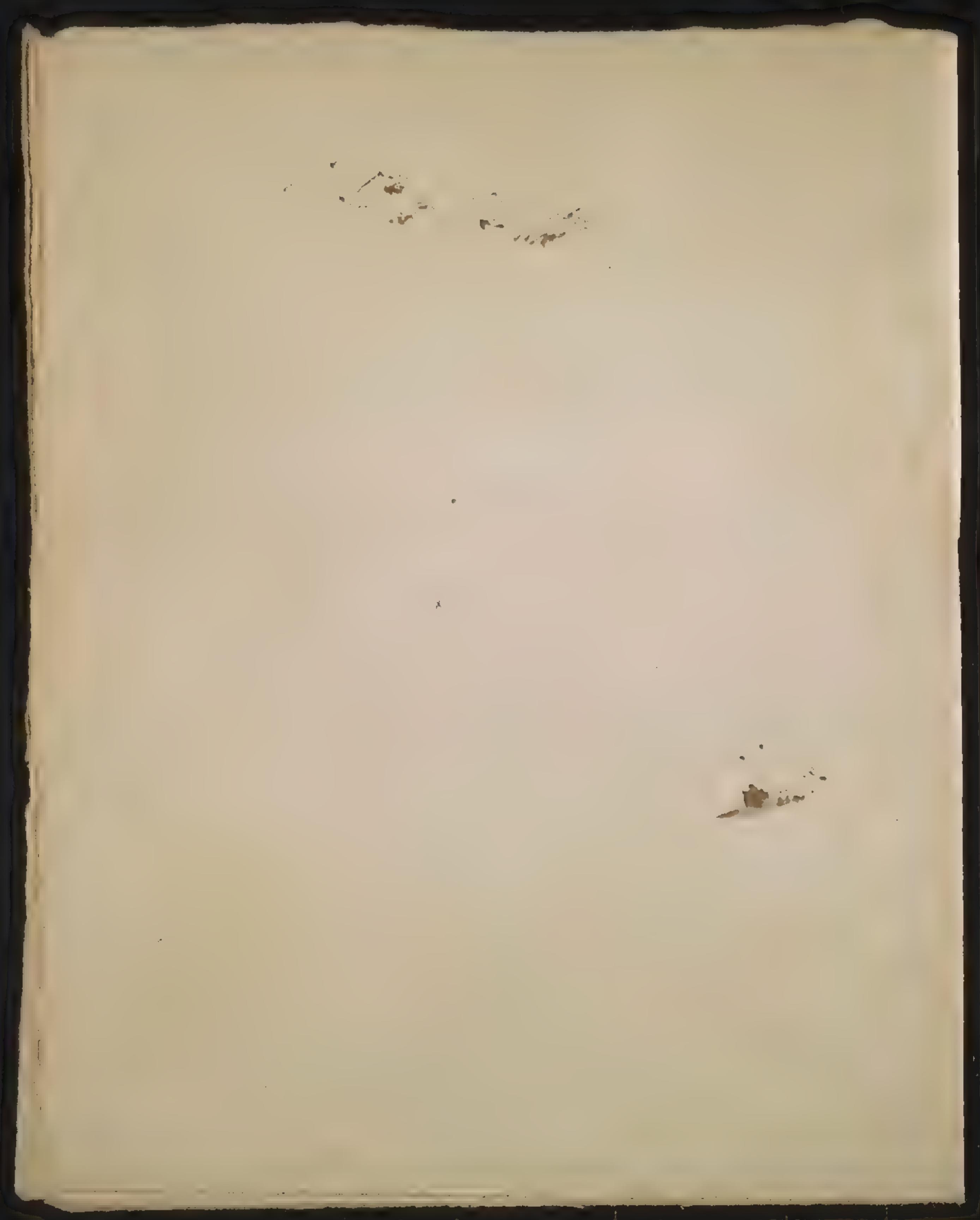
✓ The intestines of carnivorous
animals are much shorter in
proportion to the length of their bodies
than in granivorous ~~or~~ ^{and} ~~or~~ animals.

~~Vegetable food is digested~~
~~soaking the food as if~~
~~and~~ ~~for~~ for obvious reasons. Vegetables
afford their nourishment more slowly
~~and~~ with more difficulty than
animal matters, hence they require
more mastication - longer digestion, from
one or more stomachs & a longer
course of lactals to absorb the chyle
formed by vegetable food.

5

seen to be
the bowels of old people ~~is~~ in the
color, and hence the reason probably
why the wind discharged by them is
less offensive than in persons in
whom the fons are constantly lodged in
the arteries. ✓

we would next in order to speak
of that fluid which is formed from
the Chyle, and that is Blood. * *
~~so to speak~~



giddens^{to} offered, as it is in childhood & middle life.

We should prove next in order to you will perceive that I have taken no notice of the Office of the Liver. It

deal of the ~~lymphatics~~^{blood}, but before we take leave of the ~~functions~~ of the functions of the Spleen, there remains one, upon the

use of which Physiologists have been divided or silent since the ~~peculiar~~ birth of our friend ~~I shall~~ I mean the Spleen. I shall attempt to explain its use by dividing ~~upon~~ a few remarks upon it, since it has been supposed poor

to ~~the~~ contents into the Thoracic Duct, but Dr. Brown ~~too~~ believes that this is the case ~~except the blood vessels in other places~~. This from the following experiment.

Expt. - He tied up the thoracic duct in several ~~two~~ animals, and to them ~~of~~ upon madder

ch, he found tinged hair bones. It has been proved other facts favor this a ^{opinion} fact related by ~~for~~ ~~not established by~~ experiments

Mr. Richardson ~~to~~ applied a small quantity of Drindlent to the leg of a young man. soon afterwards he observed the salivary glands ~~on~~ ^{to} one half the ~~leg~~ on

Upwards by them in others & they ~~are~~ have valves - they differ in conveying ^{slightly} fluids of a different quality to the thoracic duct.

Having ~~described~~ the vessels formerly, it remains only to speak of the lymphatics. ~~which~~ ~~are~~ ~~the~~ ~~large~~ ~~vessels~~ ~~which~~ ~~convey~~ ~~the~~ ~~lymph~~ ~~from~~ ~~all~~ ~~the~~ ~~parts~~ ~~of~~ ~~the~~ ~~body~~ ~~to~~ ~~the~~ ~~thoracic~~ ~~duct~~. They are a system of small vessels originating ~~from~~ ~~all~~ ~~the~~ ~~glands~~ ~~and~~ ~~from~~ ~~the~~ ~~cavities~~ ~~of~~ ~~the~~ ~~body~~, which ~~are~~ ~~converging~~ ~~and~~ ~~contracting~~ ~~thru~~ ~~a~~ ~~series~~ ~~of~~ ~~glands~~ ~~called~~ Conglomerate. ~~and~~ ~~then~~ ~~discharge~~ ~~their~~ ~~contents~~ ~~into~~ ~~the~~ ~~thoracic~~ ~~duct~~ ~~which~~ ~~empty~~ ~~them~~ ~~into~~ ~~the~~ ~~opposed~~ ~~vessels~~ ~~of~~ ~~blood~~ ~~in~~ ~~the~~ ~~manner~~ ~~formerly~~ ~~mentioned~~.

The following circumstances deserve attention with respect to these vessels.

1 They appear to possess coats analogous

left side to be affected by it. The right side of
the mouth & tongue were wholly unaffected
by the ~~g~~ ^g these facts are important, as they
show that certain medicines ~~may~~ be introduced &
moreover

✓ The fibres of these coats, possess great
irritability, - in so much that according
to Dr Haller ~~as~~ they disappear altogether
when they are stimulated, ~~as~~ even tho'
they be filled with their natural, or th
any artificial liquor.

✓ into the system without mixing w:
the blood, or entering the great circulation.
It is thro' the lymphatics only that
liquids pass to the kidneys from the stomach,
and hence the ^{rapidity} of their passage. A
direct communication is not necessary
for that purpose. —

† In the course of this year 1808 I attended
a young goat ^{in the winter} who exhibited himself
for the disease. The ~~goat~~ was getting &c

to the coats of the blood vessels, & one of which is evidently muscular. This appears from this alternate dilatation & contraction, and 2^o from this being liable to pain -

& swelling & inflammation. Those coats are much stronger in proportion to their size than the coats of the blood vessels. ✓

They are all endowed with valves placed

in some cases at a small, in others at a large distance from each other, which prevent the reflux of the lymph, in the same manner ^{that} the valves in the veins

prevent the reflux of the blood.

They are all endowed, not only with veins, but with arteries during in which the circulation is carried on with the same regularity in the largest vessels of the body.

It has ^{the properties of} ~~the~~ ^{with} ~~the~~ ~~anatomy~~ ~~of the~~ ~~intestines~~ ~~it has~~ been supposed that they are all endowed with

Operations were on one side of his mouth only - and
~~the~~ sores were healed on ~~one~~ side that side only of
his penis by the application of $\frac{1}{4}$ to them. #
+ matters until they have ~~just~~ been ~~clipped~~
by a liquor ~~of~~ secreted by the ~~artise~~
visited in consultation

Vol they are said to possess a retrograde power
— by which we are thus contraries are
propelled in a contrary direction to that
which is natural. ~~according to~~ ^{as} Darwin
has ~~also~~ furnished many facts in favor
of this motion in these respects. & his father
has explained many of the phenomena
of diseases from it. see this work.

~~I hope you are well and have lately mentioned a fact which shows that the lymphatics convey matter to remote parts of the body, without without~~

an opening which has been called a mouth with which they not only absorb liquids, but feed as it were upon solid matters such as ~~the~~ blood-flesh, & even bone. What makes it ^{still more} probable & ^{interesting like} they possess mouths, is that they have been demonstrated in several fish Dr. Monroe supposes the Lipophores do not ~~work~~ ^{work} these.

5 The lymphatic glands appear from filling them with ^{eg} to be cellular, but Dr. Monroe has demonstrated that they are composed of convoluted vesels. Mr. Henslow however thinks he discovered a cellular structure in some of the smallest glands. It is certain that the blood vesels - nerves & the small cells of the smallest glands are connected together by cellular membrane.

Having delivered these general Observations, we proceed next to inquire in what manner the lymph which is carried

p: 657

Upon Dr. Horne's exp^t of the facts I have related I shall
A ~~in the mean while~~ I shall only remark
that ~~was~~ Horne I believe that the ^{coloring matter of the} In a sudden ~~penetrated~~
tho the solids of the body and matter of the
Hornules as it does of the ~~is~~ in Dr. Horne's
exp^t and thus found its way into the general
circulation by which it was conveyed to the
bones. The same thing probably took place in
the exp^t of Mr. Horne upon a rabbit in
which he tied up the ^{just before it entered} ~~thoracae but~~ at the
junction between the left left ~~left~~ irregular
of subclavian Veins, and afterwards gave
injected $\frac{5}{6}$ of strong Infusion of Rhubarb,
in $\frac{3}{4}$ of an hour, the Urine was voided,
the ^{pro} ~~detected in it~~ presence of Rhubarb detected in it
by the addition of potash to it. It passed
into the gall bladder in Mr. Horne's 2nd
exp^t ~~in a dog in the same way.~~
That the ~~affection~~ nothing can be

informed in favor of Dr. Monroe's opinion
from & affecting but one the sympathetic

~~the ^{secretion} of~~ ~~my dear account informing~~
Glands of the side only. I hope in our ^{expanding} pa-
thology to give a more satisfactory ~~explanation~~
of these facts. I w^t only remark further,
~~you mention that the~~ ~~long time~~ ~~before~~ ~~it~~
that I do not think that we require a passage
from the stomach to the kidneys to account
from the ^{sudden} rapid excretion of Urine after the
Stomach has been overcharged with
watery liquors. It may be explained
upon another principle to be mentioned
hereafter.

the intervention of the ~~obscure~~ duct. By
applying ~~gelatinous~~ ^{left} ointment to the ~~leg, ~~salivary~~~~
young man, he affected the ~~salivary~~ ^{glands}
of the ~~left~~ side only, and one half the
~~left side of the tongue.~~ ~~of it with those~~ ^{as} ~~affectionous~~
which attend a salivation - the right
side was wholly unaffected with the ~~G.~~

by these ~~secretions~~ ^{secretions} which repels to the heart is found in the different cavities of the body. Formerly it was supposed to be an exudation from the extremities of the arteries, but Mr. Huxley has made it probable ^{opinion} that it is a secreted liquor. This he endeavours to establish by proving that the lymph is of a coagulable nature, & that it partakes of most of the properties of the ^{ting} coagulable lymph of the blood. This coagulable quality belongs equally to the fluid which is found in the ~~secretions~~ ^{lymph} repels with that which is found in the cavities of the body. He infers it from the diseases to which this fluid is liable, all which he ascribes to the disordered state of the ~~exterior~~ ^{exterior} ~~secretions~~ ^{secretions} which secrete it. E.g.: in a Drossey the

Lymph is less valuable than in health. This he ascribes to a relaxation in the secretory vessels. Again we sometimes certain intestinal find ~~the~~ surfaces of as the ^{fractured} pleura - liver - & even the ^{inside} ~~outside~~ of the heart covered with a crust which resembles the size or fluffy coat of the blood. This Mr. Hanson supposes to be produced by too much tone or action in the ~~vessels~~ which secrete the lymph - & lastly he supposes has to be nothing but the product of a certain degree of inflammation in these vessels. - This opinion ^{my predecessor} concerning this was first suggested by Dr in this hair Morgan, and it is now I find ~~mostly~~ many ~~mostly~~ adopted by Physiological writers.

In what manner is the lymph when secreted taken up by the sympathies?



It has commonly been supposed by means of capillary attraction - hence their name of Absorbers - but I would rather suppose that it is by the effect of muscular contraction excited by the ^{or matter they up} ~~spurting~~ ^{spurting} ~~time~~ time of the Lymph, upon the mouths of the Lymphatics. -

In what manner is the lymph when it enters the Lymphatics conveyed to the ~~and throughout~~ ~~throughout~~ the body? I answer - 1 by the pulsation of adjoining arteries - 2 by the pressure of contiguous muscles - and 3 by the fibrils of the Lymph acting specifically & mechanically upon the Lymphatic vessels in every part of their course.

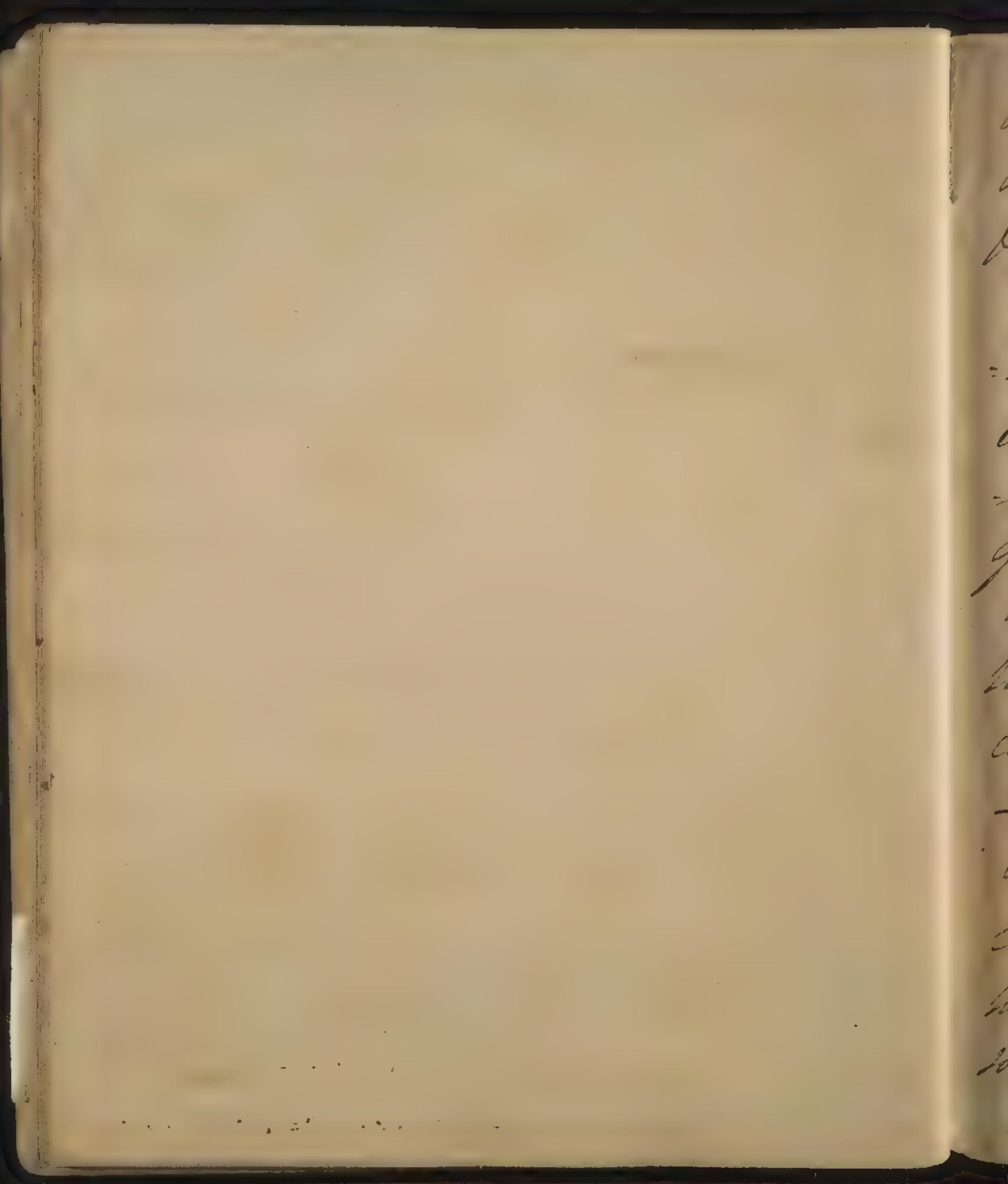
Are lymphatic reflexes found in every part of the body? I answer in every part except the head, and these

v 3^{ly} from the cures which have been
made of the Hydrocephalus interior,
which dispositions prove to arise from
an effusion of water in the ventricles
of the brain. — H

existing there is presumed, from the
- circumstances, analogy in certain fishes ~~as~~, particularly
the platy in whose head Dr Monroe dis-

-covered them many years ago 2^o. From
the history of a ~~case~~ disease related by M'Kesson.

~~As~~ a man was affected with a slight
palsy of his left arm - ~~and~~ with a hesitation
in his voice & a trembling of his lips. The
symptoms were supposed to arise from
some compression in the brain. A swelling
in a lymphatic gland in the left
side of the neck which finally suppured,
~~removed~~ all his complaints - Probably
by the translation ^{an effusion from} ~~of~~
or cephalic
an internal to an external gland,
It is presumed from the ["] certainty
that the veins in as part of the body



absorb Lymph. This has been proved by many experiments made by Monroe & Hunter.

I have said that the Lymphatics absorb solid as well as fluid bodies. This is evident from many facts. The ~~the~~ destruction or annihilation of the Thymus gland can be accounted for in no other way. The greater lowness of the bones of ^{than} young men; - the absorption of the color imparted to the bones by madder; - the peritonial softness of the bones in certain diseases; - & the detection of bone matter in the Urine, all prove that the Lymphatics possess a power over solid matters. - To these we may add the occasional disappearance of Schistous

It would seem from this fact, that
the Arteries & lymphatics perform
opposite offices in the System. The
business of the one, is to repair - of the
Other, to destroy different parts of the ~~body~~ -
- of the one, to secrete ~~of~~ a fluid,
& of the Other, to absorb it & mix it again
with the blood from which it was secreted.
Health consists in this strife between the
sanguiferous & lymphatic systems, and
no sooner ~~does an~~ ^{seems to} ~~does an~~ ^{arrustis} tape
place between them ~~than~~ ^{and} ~~they~~ ~~are~~ ~~engaged~~ -
- ~~than~~ ^{and} ~~they~~ ~~are~~ ~~engaged~~ - than we
should ~~as~~ ^{the} Drsy. Diabetes - Rickets - and
Scuphula - of ^{the} more hereafter.

travers & runs in every part of the body. They ^{appears to be} removed only in consequence of the action of the lymphatics upon them.

Mr Hunter has remarked that in infancy the cavity of the thigh bone is unusually small. As the child advances in age, this cavity becomes larger - Thus while the arteries add bony matter to the external, the lymphatics ~~do not~~ consume & absorb the internal part of the ~~bone~~ bone. In this manner - it is probable the ~~bones~~ ^{solids} are constantly undergoing a renovation in a greater or less degree, more especially in the early part of life. ✓

But we have not yet done with the offices of the lymphatics. They

